

MINING

CONGRESS JOURNAL

★
SEPTEMBER
1944
★

EXIDE ANNOUNCES
A NEW MOTIVE POWER BATTERY

the EXIDE-POWERCLAD

MADE AVAILABLE NOW to relieve existing shortages, and to supplement the Exide-Ironclad, which will continue at peak production

FOR 34 YEARS Exide-Ironclads have been recognized as the world's most dependable and efficient motive power battery. As a natural consequence the demand for them has grown to a point where production has now reached its peak. An increase will not be possible for some time to come. To relieve this shortage another truly great motive power battery has been added to the Exide line.



This new battery, the Exide-Powerclad, is not a stop-gap—not a "Victory" model—nor a composite of other battery

parts. It is an entirely new battery—a result of approximately 12 years of specific and definite research, conducted for the purpose of developing a high-quality, flat-plate battery which will meet the most exacting needs encountered in motive power service. Its essential parts are of new, improved design, and are made exclusively for the Exide-Powerclad.

Based on extensive laboratory and service tests, we can assure motive power operators that performance and power costs will compare favorably with those of Exide-Ironclads. For further particulars write to Exide.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

A
JOURNAL
for the
ENTIRE
MINING
INDUSTRY

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TIMKEN BEARING EQUIPPED MINE CARS

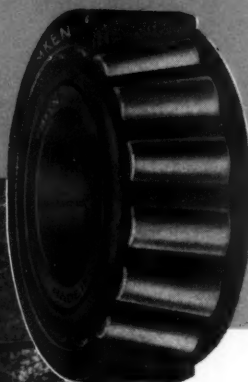
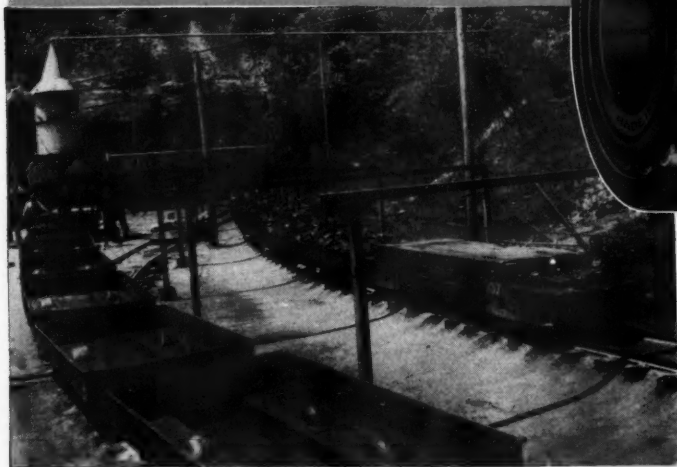
ARE "TOPS"

AT

INLAND STEEL

Wheelwright Mine

Twin portals of the Inland Steel Company's mine, showing trip of loaded cars coming out and train of empties going in.



Surface plant, tipple and cleaning plant at the Inland Steel Company's mine.



There are 900 mine cars in service at the Inland Steel Company's coal mine, Wheelwright, Kentucky and practically all of them are equipped with Timken Tapered Roller Bearings.

In August, 1931, this operator purchased 525 cars, 500 of which were equipped with Timken Bearings and 25 with another make of bearing. Since that time 375 additional cars have been bought—all equipped with Timken Bearings.

Furthermore, the bearings in most of the 25 cars referred to above gradually have been replaced with Timken Bearings. Thus, with very few exceptions—possibly none by now—all the cars

in use at this mine, a total of 900, operate on Timken Bearings and are giving very satisfactory service. In this connection it will be noted, most of the cars have been in service for approximately 13 years. More than 1,000 mine operators have proved it pays to use Timken Bearing Equipped mine cars. Are you one of them? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

MINING

CONGRESS JOURNAL

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VOLUME 30, NUMBER 9

FOR SEPTEMBER 1944

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Billion Dollar Mining Districts

The United States leads the world in number of metal mining districts which have reached the billion dollar output figure. Listed among these great American assets are such extraordinary producers as Bingham, Utah; Butte, Montana; Mesabi Range, Minnesota; and Copper Range, Michigan. The Tri-State district, according to data compiled by Victor Rakowsky, is also in this class. Others are coming along.

Since we also possess the world's greatest coal industry, we hold strong leadership in mining activities which we will do well to maintain against future threats to civilization.

★ ★ ★ ★

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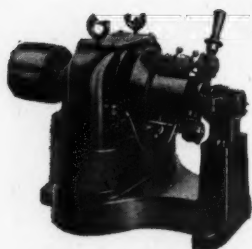
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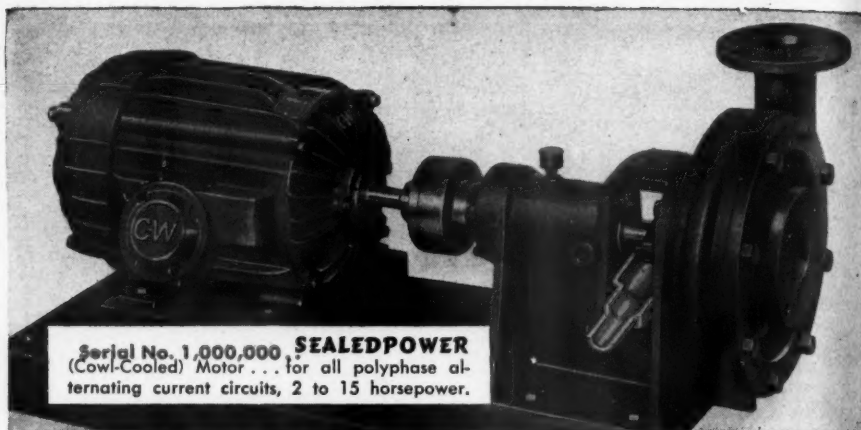


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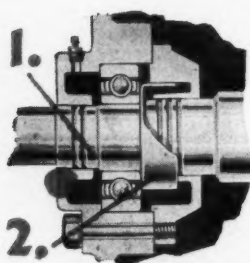




Serial No. 1 Crock-Wheeler Motor, built in 1888.



Serial No. 1,000,000 **SEALEDPOWER**
(Cowl-Cooled) Motor . . . for all polyphase alternating current circuits, 2 to 15 horsepower.



SEALEDPOWER

Industry's Most Trouble-Free Motor

PRODUCED BY CROCKER-WHEELER'S 56 YEARS OF EXPERIENCE

CROCKER-WHEELER FEATURES:

1. Patented "Groovseal"—no greasing needed for at least a year. Grooves minimize grease loss. This seal makes bearing maintenance expense negligible. It permits use of softer grease, for better lubrication and longer bearing life. Airtight seal prevents dust or other foreign matter from entering bearings.

2. Crock-Wheeler's exclusive De-Sludging Impeller. Automatically desludges . . . churns and distributes grease to bearings when motor is started.

3. Vacuum Impregnation—standard on *all* Crock-Wheeler motors. Seals out foreign matter and moisture from each individual coil . . . fills all interstices, making windings a homogeneous mass . . . reduces

hot-spot temperature and lengthens insulation life. Adherence of varnish prevents vibration of wires either inside or outside of slot. (Photograph shows cross sections of baseballs, (left) after vacuum impregnation and (right) before vacuum impregnation. Note penetration of varnish to center of tightly-wound ball, making it a moisture-proof, homogeneous mass.)

SEALEDPOWER FEATURES:

4. Totally Enclosed Cowl-Cooled Construction resists corrosion. Protects against acid or alkali fumes, splashing or dripping liquids, air-borne moisture, steam, corrosive gases, conducting dusts, metallic chips, etc.

5. Fin Type Construction for non-clog ventilation and easy cleaning.

WRITE FOR LITERATURE ON THE **SEALEDPOWER** MOTOR, WHICH IS WINNING THE PREFERENCE OF MACHINERY MANUFACTURERS AS WELL AS OF MOTOR USERS. OR CALL OUR NEAREST OFFICE.

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**WANT TO IMPROVE YOUR
HAULAGE CAPACITY?**



If you want to gear your haulage capacity to your loading capacity, this book will tell you how. It's designed for busy men; condenses the story of Ar-Moored Ties into 8 pages of facts and pictures.

Ar-Moored Ties are giving dozens of mines high-capacity, low-cost track in working sections and main haulageways. Constructed of a preformed and pre-bored

chemically pressure-treated oak base to which a Bethlehem Steel mine tie in specified sizes is attached, Ar-Moored Ties speed up track-laying, maintain gauge, are stable under high speed traffic, and can be repeatedly lifted and reused.

For the complete story, including some actual cost figures, ask for the book, "AR-MOORED TIES for High Track Capacity."

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THE INDUSTRY THAT SERVES ALL INDUSTRY

Trade Mark

ANNOUNCING U. S. ROYAL MINING MACHINE AND

The name "U. S. ROYAL" has long been reserved by this Company for rubber products of exceptional quality.

U. S. Royal Mining Machine and Locomotive Cables, as an example, have been known in the mining industry for many years for their balanced construction, flexibility, dielectric strength, smoothness of finish and physical toughness.

"U. S." Royal Safety Tested Mining Machine and Locomotive Cables are now available at our "U. S." Branches.



G THE NEW

Safety Tested

D LOCOMOTIVE CABLES

Now comes a new development in rubber technology greatly speeded by critical wartime needs...a new material, successfully embodied in the new line of U.S. Mining Machine and Locomotive Cables...and these have been given the name "U.S. ROYAL."

These new U.S. Royal Safety Tested Cables offer to mine operators all the qualities essential for long, economical, trouble-free service. They truly merit the name "Royal."

UNITED STATES RUBBER COMPANY

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Serving through Science



*Even the best wire rope—alone— isn't enough.
The buyer of rope for the vital war job of
today and the cost-conscious job of tomorrow
has a right to all that goes with good rope.*



WHAT CAN YOU EXPECT from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. " " Your postwar jobs and postwar profits will depend in part upon keeping rope-rigged equipment operating at lowest possible cost. You can leave that part to Roebling.

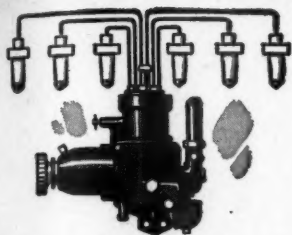
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY • Branches and Warehouses in Principal Cities



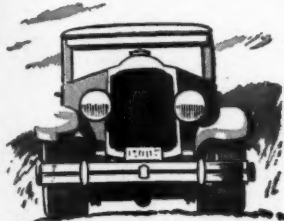
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Dependable diesels are not built in a day. For instance, in perfecting the exclusive Cummins Fuel System, now an accepted model of simplicity and efficiency, 3,000 different injection mechanisms were developed and tested between 1923 and 1927 before Cummins engineers were satisfied. Insistence on "making it right," regardless of cost, explains why Cummins Diesels are known everywhere as the dependable diesel.



A Cummins-powered Packard sedan was the world's first diesel-propelled automotive vehicle. Driven in 1930 from Columbus, Ind., to New York City by designer-president C. L. Cummins at a fuel cost of only \$1.38, the car was barred from the New York Auto Show and, later, the Atlantic City Road Show. Today, Cummins Diesels are found in practically all leading makes of heavy-duty trucks and construction equipment.



In 1930, under AAA sanction, the world's first official record for diesel-powered vehicles was established at Daytona Beach, Florida, by a Cummins Diesel installed in a Packard roadster—83 mph. The engine was a "dolloped up" Model U designed for marine service. Although built to operate at 800 rpm., it was revved up as high as 1900 rpm. during the run, without any difficulties developing.

CUMMINS DEPENDABLE DIESELS

Automotive Models: Designed for all types of heavy-duty trucks in either highway or off-the-highway service.

★ ★ ★

Industrial Models: Portable and stationary engines, power units, and generating sets for service in any industry requiring heavy-duty power.

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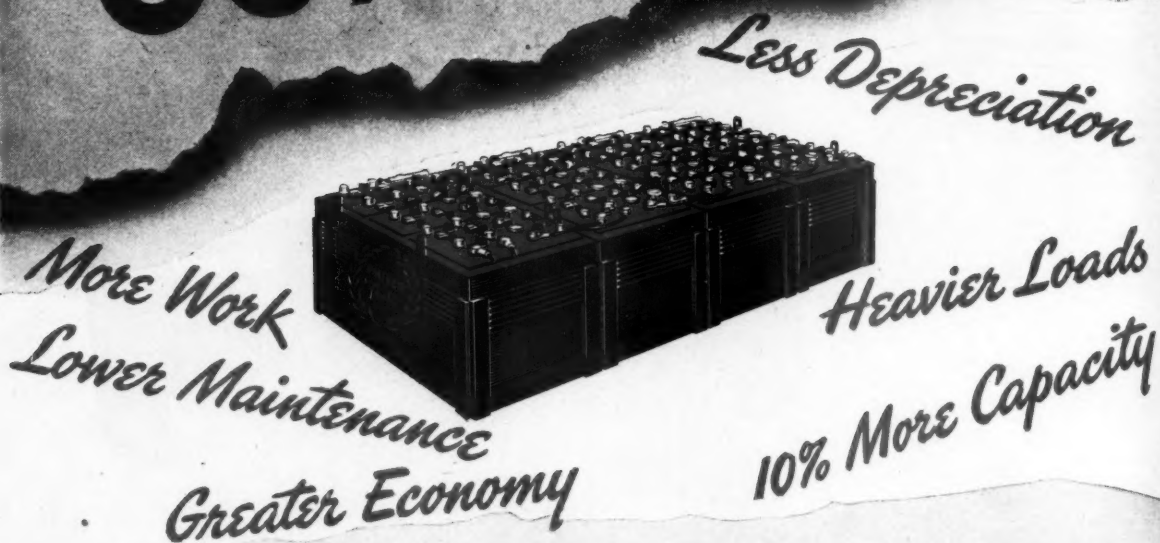
Marine Models: Propulsion engines and marine type generating sets designed for all types of fishing boats, work boats, and pleasure craft.

Makers and Breakers of Precedents in Power

In the early 20's, most authorities conceded 600 rpm. to be "tops" for a diesel. Cummins conceded nothing—bumped the Cummins Diesel of that early day up to 900 rpm. and kept right on bumping. That's how the modern, high speed diesel was created . . . by making and breaking one precedent after another . . . by doing things in design, construction and metallurgy "that couldn't be done." As a result, today's high speed Cummins Dependable Diesels are doing tough, heavy-duty jobs scarcely dreamed of twenty, or even ten, years ago. Not only doing them, but doing them cheaper, better and faster than they were ever done before. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



Just Announced!
**REVOLUTIONARY NEW
"PHILCO THIRTY" GIVES
30% LONGER LIFE!**



Again . . . Philco Makes Engineering History

At last, a mine locomotive and shuttle car battery with a revolutionary, new construction that actually gives you 30% longer life . . . and more! A brand new principle of fabricated insulation developed after years of research in the Philco laboratories, and now introduced after exhaustive tests in actual service. It's the *Philco "Thirty"* . . . your post-war battery, available now in certain types and limited quantities. Write today for full information.

PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey

FOR 50 YEARS A LEADER IN MINE STORAGE BATTERY DEVELOPMENT

"I was one of the wise guys!"



"Nuts," I used to say to this Mack salesman. "I should pay you more for a truck when I can get another kind cheaper? So what if it ain't as good? I run the hell out of it—then I buy me a new one. That way I'm ahead of the game and I always got a new truck, see?"

I was a smart apple, I was. Yeah.

Now look at me—right behind the eight-ball. Sure I still got a truck and I'm stuck with it for the duration! What that junkheap is doing to me shouldn't happen to Hitler.

And that ain't all. That brother-in-law of mine, Benny, he bought a Mack 'way back, and he ain't letting me forget it for a minute.

You shoulda heard him last night. "Just like I always say," he crows. "You pays your money and you takes your choice. Now you take that Mack of mine. That baby's been over a hundred thousand miles and I ain't had the case down yet. Never missed a trip, and what's more, the way she's running, I know I ain't going to!"

Personally, I still think somebody dropped Benny on his head when he was a baby. But here lately, I'm beginning to think it didn't do him no harm.



Mack Trucks, Inc., Empire State Building, New York, N. Y.
Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick,
N. J. Factory branches and dealers in all principal cities for
service and parts.



Mack

TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!



Fastest, Lightest Post-Mounted Coal Drill

**40 to 60
HOLES PER SHIFT**

CP No. 574 Permissible Electric Coal Drill—fastest and lightest mounted electric coal drill and one of four CP post-mounted models—has a speed of 40" per minute, 40 to 60 holes per shift. Safe powerful motors, approved by the U. S. Bureau of Mines, run at unusually low temperatures and have large momentary overload capacity. Ball bearings, heat treated gears, fine material and workmanship assure long life and low maintenance. Write for Catalog 901, Second Edition, illustrating various combinations of motor hookups, clutches, posts, boots, boxings, etc. Select the drill assembly best suited to your requirements.

Why CP Post-Mounted Electric Coal Drills Cut Drilling Costs

Quicker Set-up of Post • Faster Drilling Speed
Parallel Drilling Within 2 Inches of Roof or
Bottom • Accident-Proof Auger Socket • Accident-Proof Boxing and Liner • Adjustable Feed
Clutch — hand controlled

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PNEUMATIC TOOLS
ELECTRIC TOOLS
(Nicycle...Universal)
ROCK DRILLS

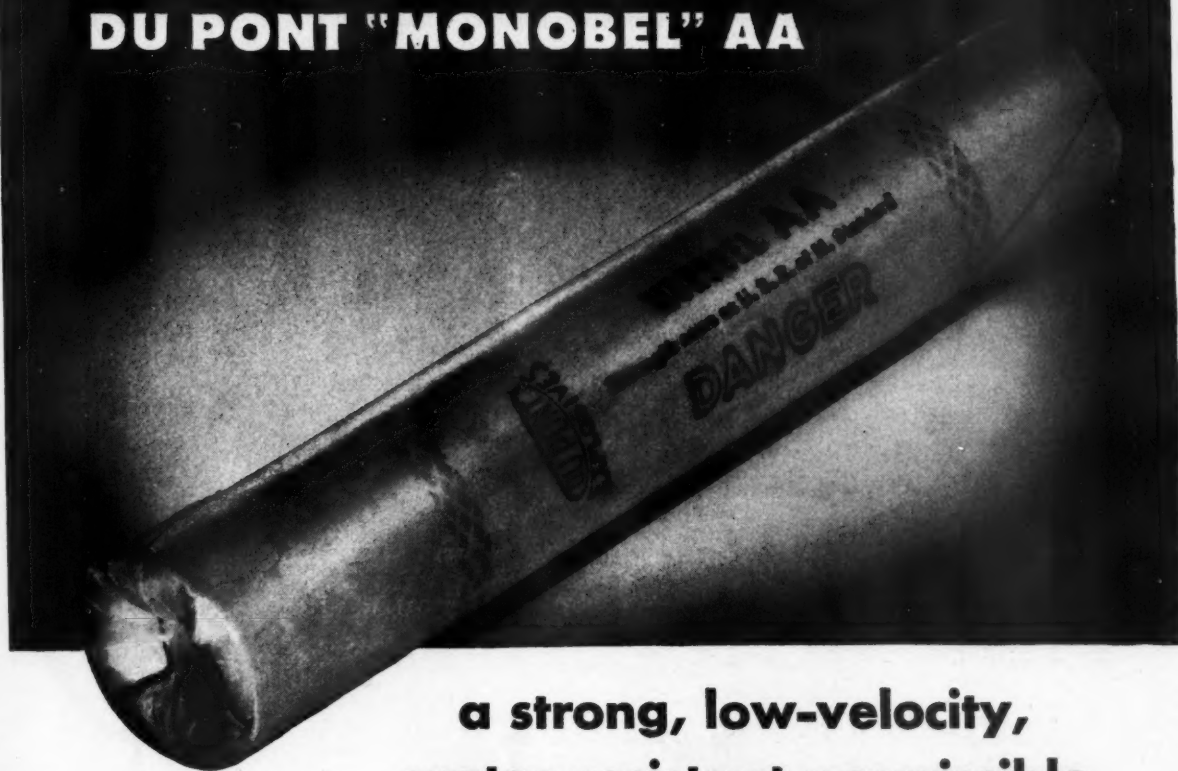
CHICAGO PNEUMATIC
TOOL  COMPANY

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AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

NEW

DU PONT "MONOBEL" AA



**a strong, low-velocity,
water-resistant permissible**



"Monobel" AA is an entirely new ammonia permissible. It has been developed to break coal in wet mines and in thick, hard shooting seams. It meets the requirements of such work because it has:

1. HIGH WATER RESISTANCE
2. HIGH CARTRIDGE STRENGTH
3. LOW VELOCITY
4. EXCELLENT FUMES

Don't overlook the possibilities of "Monobel" AA. It has a combination of properties not previously available. Get all the

facts. Talk with your Du Pont Explosives Representative. Or, write to E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

INVEST IN VICTORY—BUY MORE WAR BONDS

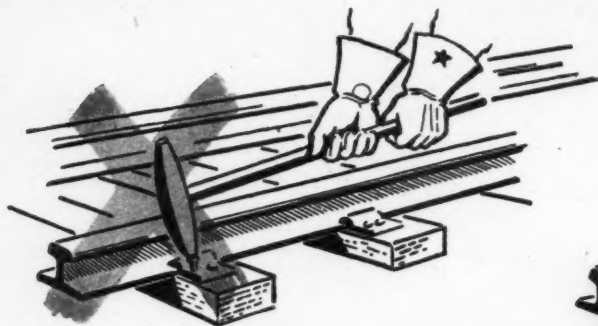


A Development of Du Pont Research
"Monobel" AA is made water resistant by a basically new method. It is another contribution of Du Pont research to the progress of the coal mining industry.

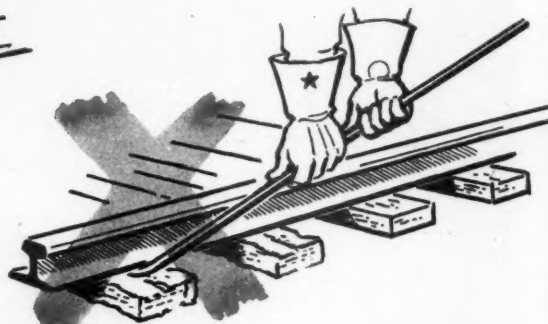
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Blasting Supplies and Accessories

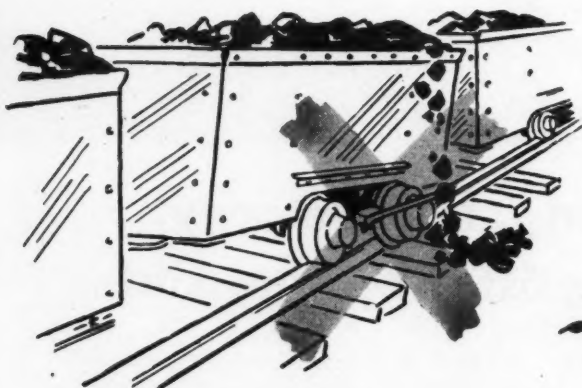
How Preformed Trackwork Saves



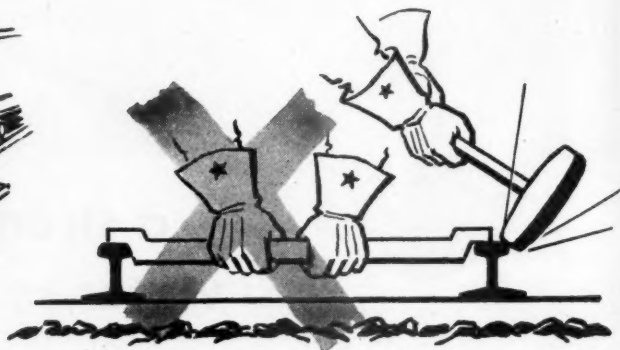
It halves laying time



It reduces track maintenance



It cuts down derailments



It releases men for other work

If you were planning to build a house, you'd probably employ a competent architect. He'd save money by specifying the proper materials. He'd recommend a design that would best suit the dimensions, shape, and physical features of your lot.

Bethlehem mine-track engineers render a similar service when you order Bethlehem preformed trackwork. They calculate and plan even the minor details of the proposed layout; recommend weights of ties, lengths of switches, turnout angles, etc.—all with an eye to the greatest economy in the long run.

Then, when details are settled, the

track is cut, bent, and prefabricated in Bethlehem shops, where expert supervision and complete equipment are available. It comes to you ready for laying—fabricated to the greatest possible extent. Preformed turnouts are supplied with both curved and straight stock rails and closure rails; with switch stands, ties, special joints, frogs, and everything else that is necessary for

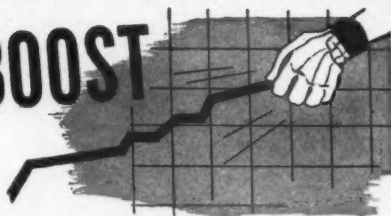
a complete, easily assembled layout.

During this critical war period, no mine can afford lost hours due to excessive laying time, slow haulage, derailments, and extra maintenance. A great many of these time-consuming troubles can be eliminated by changing from "home-made" layouts to Bethlehem prefabricated trackwork.

Some of the country's best-known coal mines have already proved the soundness of this plan. They have shown, furthermore, that it results in outstanding economies. If you haven't already investigated, a Bethlehem engineer will be glad to talk over details.



GIVE YOUR TONNAGE A BOOST



MINE CAR LOADERS—The famous Gardner-Denver fulcrum principle provides more force for crowd—greater speed at discharge . . . permits loading out more cars per man-hour. Powerful, five-cylinder radial air motors give Gardner-Denver mine car loaders plenty of power to crowd into the muck pile and come up with a full dipper every time.



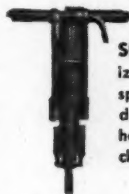
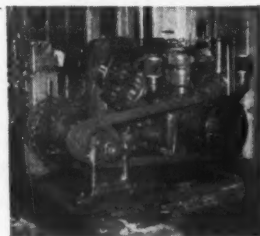
STOPPERS—Gardner-Denver Stoppers are preferred by drill runners wherever they are used. They're easy-handling with no pull on the holding handle . . . the drill, not the drill runner, fights a tight bit. A fully automatic system of air cleaning ejects all sludge and water from the steel and front end of the drill. They've got plenty of extra power for faster drilling in all kinds of rock.

If YOU'RE looking for equipment that can help you get the ore out faster . . . that can boost tonnages . . . you'll want to know about the Gardner-Denver line. Gardner-Denver mining equipment accelerates production wherever it is used . . . helps speed up the entire drilling, blasting, mucking cycle. And it's popular with the whole mining family—operator, superintendent, engineer, and drill runner. For Gardner-Denver equipment handles easily . . . causes less strain and fatigue . . . permits more footage per shift with less time out for maintenance. Get acquainted with the complete line. You'll find them real tonnage boosters.



SHARPENERS—A sharp cutting edge, properly formed, is a primary essential for fast, economical rock drilling. Gardner-Denver Sharpeners provide that edge in a minimum of time. They will forge and shape a perfect bit or shank on any standard drill steel section. The exclusive constant pressure air return speeds up sharpening and effects considerable savings in air used.

COMPRESSORS—Gardner-Denver Air Compressors are exceptionally rugged, efficient units that are suited to every mining need. They deliver a large volume of air with exceptionally low operating and maintenance costs. Completely water-cooled, they effect savings in lubrication oil and discharge air at lower temperatures.



SINKERS—Perfect balance and smooth, easy handling characterize the Gardner-Denver line of hand-held sinking drills. From the speedy S-33 to the heavy-duty, powerful S-79, they speed up drilling operations even in the toughest of rock formations. They have exceptionally strong blowing capacity and excellent hole cleaning ability.

AIR HOISTS—A full load every trip plus the ability to develop high speed in either direction for a quick load and a quick return make Gardner-Denver Slushing Hoists a big favorite among mining men. An all-steel gear train from the motor drive shaft to, and including, the final drive, and totally enclosed construction, keep these hoists operating dependably year after year.



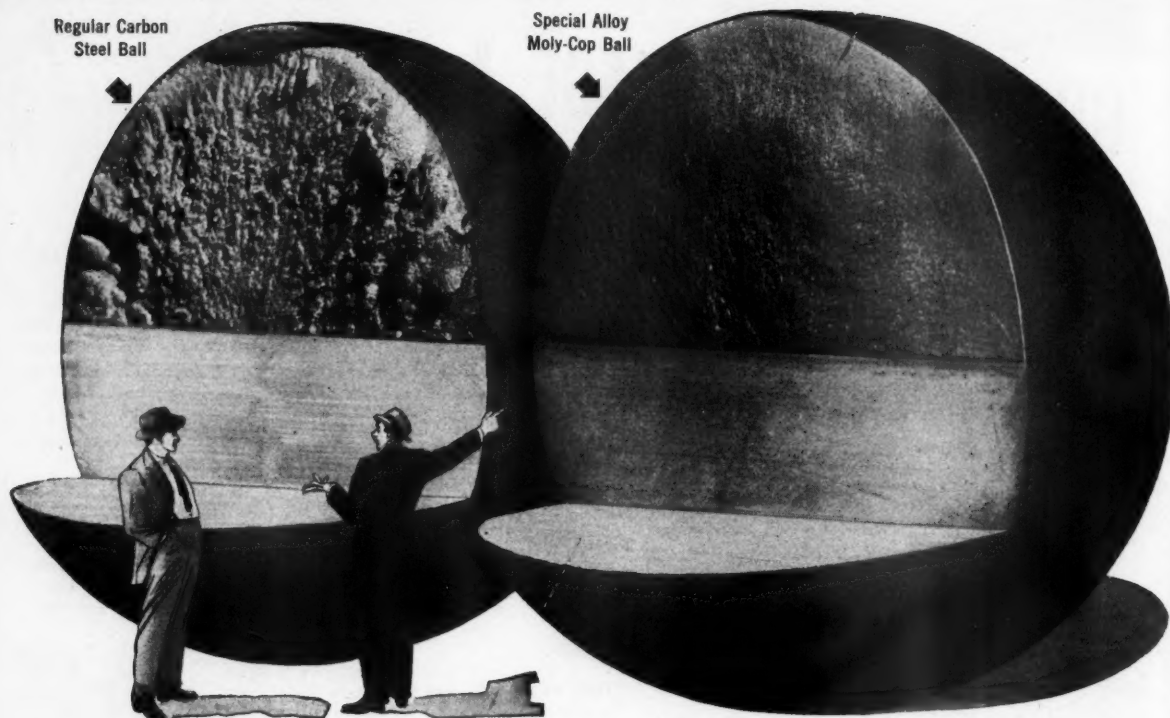
DRIFTERS—Here is the line of drifters that assure the highest drilling efficiency . . . minimum vibration and lower maintenance. They are easy to operate . . . minimize operator fatigue. Gardner-Denver Drifters are manufactured in both automatic and hand cranked styles.

For complete information and specifications on Gardner-Denver mining equipment, write Gardner-Denver Company, Quincy, Ill.

GARDNER-DENVER



Since 1859



From the Outside—Grinding Balls May Look Alike

***But Let's Take a Look
INSIDE***

Notice the difference in these fractured sections of grinding balls. In the Moly-Cop ball on the right, the extreme outer hardness and fine martensitic structure extend into the inner core of the ball, insuring longer life and more even wear. This difference is due to the superior characteristics of the perfected alloy steel and the methods of forging and heat treating in the manufacture of Moly-Cop balls.

TRADEMARK REG.

MOLY-COP

COPPER-MOLYBDENUM-ALLOY

Grinding Balls

... GRIND TWICE AS MANY TONS PER BALL AND MORE TONS PER MILL HOUR. Important as this is today, with all our efforts for maximum production, this may be even more important tomorrow. The working of low grade ore is ahead, which must be accompanied with lower operating costs. Use Moly-Cop balls. Assure high grinding efficiency. Save your steel and

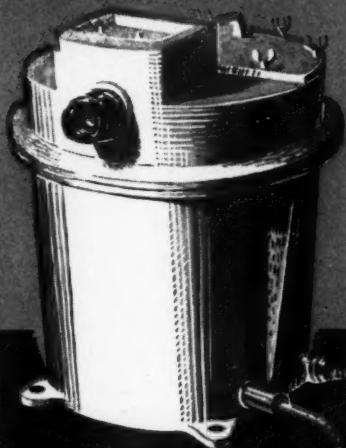
save your power. Effect lower grinding costs. In use throughout the world.

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STEEL CORPORATION**
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WORLD'S FASTEST CAMERA

Charts a Burst of Dynamite



TO CAPTURE pictures of explosives *in action*, Hercules scientists designed and built the world's fastest camera. Operating at exposures as fast as *one ten-millionth of a second*, this amazing instrument photographs dynamite at the very instant of its violent chemical change. Even powerful nitroglycerin's path of detonation, traveling at 250 miles a minute, is "stopped" on film by this shutterless, electrically operated camera.

This study of how explosives behave is only a small part of the intensive research being conducted daily by Hercules. Physicists, x-ray workers, microscopists, and other highly trained specialists are constantly searching for new and valuable knowledge on explosives which may prove helpful to you and your business.

-----**HERCULES EXPLOSIVES**-----

HERCULES POWDER COMPANY

INCORPORATED

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Listen, wire rope users....



HAVE YOU TRIED TO GET TIGER BRAND...LATELY?

WHEN America was plunged into war, we were asked to put practically our entire wire rope production at the service of Uncle Sam. For good wire rope, in enormous quantities, was urgently required for military use.

As a result, we have had to disappoint some of our customers. They were prompt to realize that it was not only a case of military necessity but to their ultimate advantage to stand aside for the time being. We are grateful for their cooperation.

Although enormous tonnages of TIGER BRAND are still going to our fighting men and to our Allies, a steadily growing quantity is being made available for use here at home. So, when you need good wire rope, give us a call. The chances are becoming increasingly better that we may be able to supply you with your old favorite, American TIGER BRAND—today even a better product because of its war service.

*Excellay
Preformed*

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY

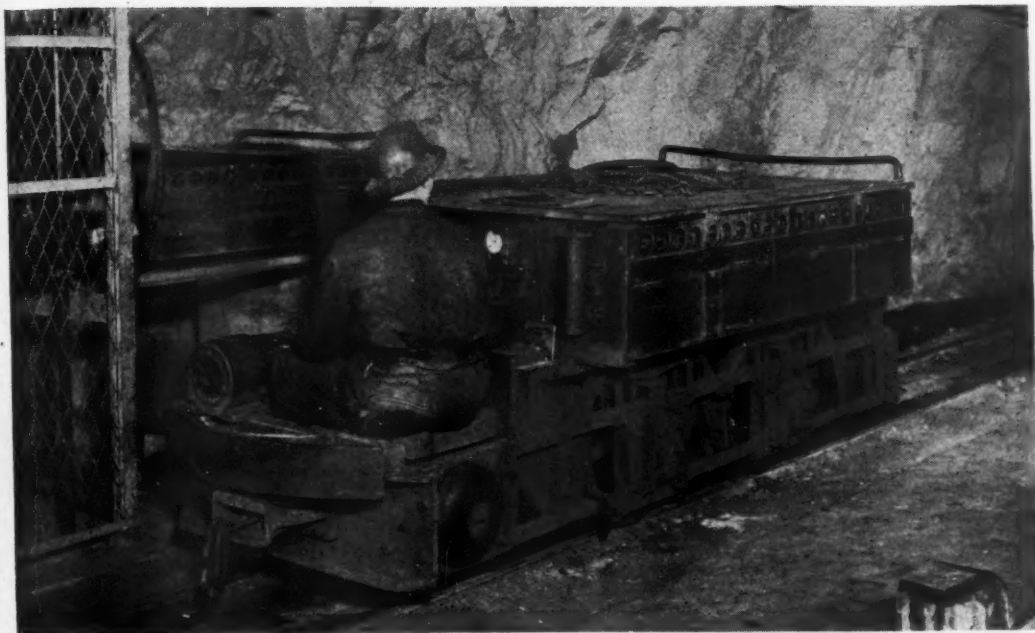
San Francisco

United States Steel Export Company, New York



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MINING CONGRESS JOURNAL

Published for the Entire Mining Industry
by The American Mining Congress

S. A. TRENGOVE, Editor

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On Throwing Away Crutches

BREAKING a leg is a pretty serious business, but the long up-hill road to recovery afterward is really the most serious phase of the ordeal. After becoming accustomed to the crutches, one has a mental hurdle to make. He must learn to walk again! Throwing away crutches often calls for real fortitude.

We perceive this very thing happening in the matter of certain "emergency" agencies and activities (crutches), created by Congress and executive orders in recent years. As aids in helping us over crippled periods, some of these devices were undoubtedly of value temporarily, but were created only as such! Now we can't get up the courage to dispense with them.

The *Wall Street Journal* of August 28, 1944, points out, as a case in point, that Reconstruction Finance Corporation, created to bridge a temporary gap, has now grown so large that it is doubtful if any one person is familiar with all its ramifications!

Pointing out that deficit financing, crop loans to farmers, food stamp plans, WPA and NYA are among past and present artificial supports either now accepted or clamoring for revival in some form, this publication states, "Of course many people who urge continuation of these activities do so for purely political purposes. Others believe that they can use them, as they have in the past, as means of propaganda and action to change the social and political order. However, most of the sponsors probably act from sincere conviction and it is their mental processes and not their honesty that is to be looked after.

"A good many of these people have spent their whole adult lives in an atmosphere of makeshift and improvisation. They have never experienced an economy which walked without those crutches. Their talents have been occupied with makeshift measures. It is hardly surprising that they have lost sight of what these things really are; they appear to them, not as something to be cast aside as soon as possible, but as something necessary and permanent."

The imprudent patient may deteriorate to the point of spending all his days in a wheel-chair—or worse, in bed. What a striking parallel to modern economic thinking! Actually we're pretty much in that wheel-chair right now.

It's all very much like many other accomplishments. Learning to swim is one; the flight of an airplane is another; and, as our contemporary puts it—a bicycle can remain upright if propped, or supported by rigging, but it derives balance, unassisted, from its own momentum when used in the prescribed manner. All such things require courage and the help of forward motion.

So, instead of keeping our economy constantly propped up by hanging on to these crutches and everlastingly finding new and bigger ones, let us get ready to toss them aside and show ourselves that as a nation we can walk unassisted—or that figuratively speaking we can ride a bike, swim, fly, or what have you!

It is time for the present generation to get some experience with an economy that derives its balance from its own momentum; an economy of "*production, trade and investment of capital accumulation.*"

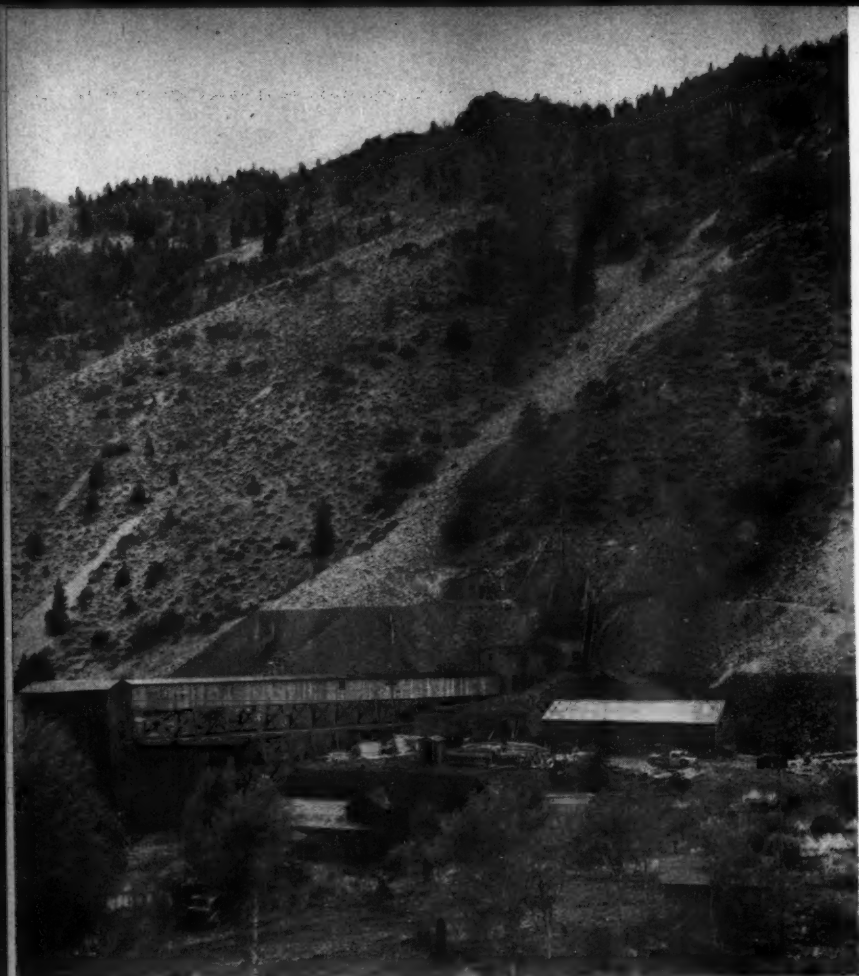
What the Other Fellow Knows

MANY a tough problem of long standing has been solved by introducing a fresh new thought or viewpoint. The interchange of ideas between men working in closely related fields is bound to create many mutual advantages.

We are thinking now of the broad and diversified field of mining and of the fact that many of its men confine their investigations and ideas solely to some one branch of the industry. It's not uncommon to encounter men who center their entire professional attention upon coal, or gold, or iron or copper or zinc or some other mineral product. While these men can attain the enviable distinction of "expert" in one type of operation, they lose much and the other fellow loses much in the absence of intercommunication. We think that they could become even more valuable as experts at home if they looked up their neighbor's ideas now and then.

All branches of mining have a great deal in common. The loading and haulage practices of today's coal mines might serve as excellent guides to new economies in tomorrow's iron or copper operations. The concentrating practices which are winning for one field might ere long introduce new advantages in another. Perhaps the metal miners have discovered some shaft-sinking stunts which the coal men may use—and vice versa. We think the fullest possible encouragement of such idea-swapping stands at the top of the list of ways and means for definite forward progress.

For those mining men who find time to set their problems and method of solution down on paper we have the warmest praises to sing. Their contributions make it possible for all branches of the profession to learn from all others. Let this exchange of ideas go on then, and let it grow upon us with ever-increasing vigor and benefit. The pages of the mining press stand ready to lead and to share in this extremely important professional responsibility.



Operations at Clayton Silver Mines

THE Clayton Mine of the Clayton Silver Mines Company is located in the east-central part of Idaho, in Custer County, two miles north of U. S. Highway No. 93. The highway follows the main Salmon River from 20 miles north of the City of Salmon almost to the source of the river, in the Sawtooth Mountains—a total distance of 150 miles. The river flows through rugged mountainous country with steep canyon walls coming down to its edge for a good share of the distance. Occasionally there are small flats along the river which are used for agriculture and stock raising. The settlement of Clayton is located on the river's bank 85 miles south of Salmon and 90 miles north of Sun Valley, at an elevation of 5,400 ft. The tops of the adjoining mountains rise to 9,000 to 11,000 ft. elevations.

Mine's History Follows a Very Common Pattern

The history of the mine is a repetition of the history of many small isolated mining properties. It was first located many years ago and was worked intermittently by succeeding

A Careful, Analytical Approach to All its Problems Has Placed This Small Mine on a Steady Production Basis

By C. A. FAY

*Manager
Clayton Silver Mines*

owners who never found much ore and never did much work. In the 1890's a small lead smelter was in operation at Clayton and at that time there may have been a small production from the mine. The value in this first ore production, no doubt, was derived from its fluxing value in the treatment of other ores. In the middle 1920's, a Clark Mining Company came into possession of the property and found the first ore in the creek level tunnel, that is, the first ore that presented a possibility of yielding a profit. Their attempt at mining was the typical layman attempt at mine operation, so that, with insufficient and inadequate mining and milling equipment they were soon in trouble and had to quit.

This brings the property history up to 1928 when the people who later formed the present company came into possession. During the next two years the ground was surveyed and the original claims patented, additional claims located, and the title cleared. Getting ahead of an orderly development, a shaft was then sunk, but due to the large amount of water and insufficient power, it had to be abandoned. Nothing more was done until 1934 when a second jig mill was constructed, the shaft was unwatered and a crosscut driven to the vein from the bottom of the shaft. The showing encountered in the crosscut was disappointing and no further development was done on that lower level at that time. Power shortage again

plagued the operation. The mill was run for about six months on ore that had been opened previously by the Clark Mining Company, but because of the disseminated character of most of the values the recovery in the mill was poor, and the property shut down again in November, 1934.

Realistic Plans Initiated

In April, 1935, another operation was started under the direction of the present management. At the outset it was decided that an inexpensive but good flotation mill was needed and that the tunnel level should first be thoroughly explored and mining started on that level before more costly, deeper development should be undertaken. That is, if the property couldn't pay its own way from the tunnel level ore, after the initial outlay for mine and mill equipment, it wasn't much of an orebody and probably couldn't be made to pay on the costlier ore below. The initial expense of milling the ore mined from the tunnel level would be only a fraction of the cost of equipment required to mine through the shaft. The information to be obtained by a thorough development of the orebody on the tunnel level would also be invaluable in guiding the future deeper development.

During the mill construction period, the mine development proceeded and the ore thus opened was prepared for stopping. The first ore mined was very low in value, considerably lower than had been anticipated, due in part to the mining of the best ore for the 1934 jig mill. This however, was compensated for by 12,000 tons of jig tailing, already mined and crushed, which assayed as high as the newly mined ore. With further mine development, the grade of the ore improved and an accumulation of ore reserves began. The practice has been, from the beginning, never to overproduce from the mine and never to increase production until the reserves justify the additional capital expenditure for the equipment necessary.

More Power Improves Operations

In 1937 new power was developed, the shaft was unwatered, development of the first shaft level was started (the level which was disappointing in 1934), a fine crushing plant was added to increase the capacity of the ball mill and additional flotation equipment was installed. In the course of the development of this shaft level, better ore was encountered and zinc was also encountered for the first time in appreciable quantities. The ore reserves increased despite the fact that the introduction of the fine crushing had increased the capacity of the

ball mill from 60 to 110 tons per 24 hours. When the development of the first shaft level was well along, the shaft was sunk to the second level. This level has now been almost completely developed and the shaft should be sunk to a new level, but manpower shortage has made it impossible to continue normal development and maintenance while continuing capacity production. Since the installation of the fine crushing unit, ore production has remained stationary while metal production has increased greatly. Metal production has increased over that of the previous year for each year of our operation.

A plentiful supply of power is probably the most important factor in the successful development of a small mining operation. Initial cost of power plant is high so that it is unsound to install a first power plant to take care of the eventual power demand. It is, however, desirable always to have an excess of power; in fact, such a condition is a necessity. When an increase in operations which will require more power is contemplated, the power plant increase is the first step. At the beginning of operations in 1935, the power plant equipment consisted of a Pelton Water Wheel belted to a 100-k.w. generator besides two 40-h.p. International semi-diesel engines. A single cylinder compressor was driven by one of these diesels and the Pelton Wheel furnished the electric power for the newly constructed mill. No sooner had the mill started than a power shortage developed due to a drop in the creek flow. Up to this time no record had been kept of the stream flow and hearsay regarding the flow was far over the actual. To meet this power deficiency a D-13000 caterpillar, 90-h.p., direct connected to a Westinghouse 70-k.w. generator, was soon installed which took care of the current demand and allowed for a small surplus.

By 1936 the mine had been developed sufficiently to justify an increase in production. To accomplish this, another hydro-electric plant was installed 6,500 ft. down stream. It began to generate power in 1937. This is a three-ft. Pelton Wheel direct connected to a 300-k.w. Westinghouse generator and its excitor. The water comes to the wheel through a large pipeline laid along the creek. The fall from the intake to the wheel is 300 ft. and the effective pressure at normal water flow is 132 lbs. per square inch. The intake is just above the mill, so that mill tailings can't get into the pipeline, and below the mine outlet so that the water pumped from the mine can get into the pipe. This power is generated at 2,300 volts and is transformed at the workings to 440 volts. The power from the separate plants is synchronized into one system.

Special Problems Encountered

Since the new plant was to be located over a mile from the other workings the question of maintenance was of prime importance for if it was necessary to have an attendant at this small capacity plant the cost of the power produced would be extremely high. At a small additional first cost the plant was designed to operate without attendance. If anything should go wrong it automatically shuts down, it has a capacity considerably over what power can be generated from the stream flow, and it has a forebay control which opens the needle nozzle when the water rises slightly in the forebay and closes when the water level falls a like amount. This latter feature makes it possible to use all of the water and eliminates the possibility of using too much, with resulting drop in pressure at the wheel. No costly storage dam is necessary. An attendant spends about one-half hour at the plant each day and the remainder of the day the plant just runs. Power has been continuous from the first without any major repair being necessary. It does not average one hour per month out of operation and has run for months without any shutdown.

The added electric power made it possible to put an electric compressor into operation to provide more air for mine operation besides the use of electric pumps in the mine, an electric hoist, and the new fine-crushing plant. In a small operation the increasing demand for power is continuous and the surplus, whatever it is, is soon used up.

With deeper development more air was needed and more water in the mine had to be pumped. To meet this demand an Ingersoll-Rand 4-cylinder ZVO diesel compressor was put into operation which doubled the capacity of the air to 710 ft. at 6,000 ft. elevation and freed the electric power which was formerly used to compress air. The diesel compressor is started and stopped and fueled at the beginning and at the end of each mine shift, and has no other attendance. It is located in the power house at the mine and has been running on that schedule since 1940 without major repair or overhaul.

The power situation was good until additional water was encountered with more development in the mine. Simultaneously it also became desirable to recover the zinc which had formerly been wasted. This called for another power increase. A Worthington diesel CC-6 and Westinghouse auxiliary electrical equipment made up the new unit. This unit has a capacity of 260 h.p. at 6,000 ft. It is located in the mine power house and runs continuously with practically no attendance, giving us a large power surplus.

Geological Considerations Aid Mining Operations

As this article deals primarily with operation problems the geology would be of little interest except that a brief statement may help to understand the mining method more readily. The ore is deposited in a broad zone in dolomitic limestone adjacent to quartzite beds. About half the values are disseminated through the zone with the remainder found in small streaks and bunches of highgrade following a network of fractures within the broad zone. The strike is a little west of north and the dip is from 70 to 80 degrees to the east. An unusual feature is that the ore areas in the broad zone rake at a very flat angle to the north, away from the shaft, which makes it necessary to do an excessive amount of development work. There is a decided tendency for the zinc to be concentrated in the top, the lead-silver ore in the middle, and the high silver ore on the bottom of the ore shoots.

Shrinkage Method of Mining Selected

The ore is mined by the shrinkage method, breaking down ore and drawing off enough so the back can again be drilled and blasted. This process is continued until the level above or the top of the ore is reached, after which a stope full of broken ore remains to be drawn off as needed. When ore is encountered on a level, the drift is widened to 10 ft. regardless of the width of the ore. This 10-ft. drift is timbered at 5-ft. intervals with a cap and two 8-ft. posts. The sets are lagged over with 4-inch sawed timbers and a chute lip is built into each alternate set which places the chutes 5 ft. apart. A raise is started for the level above after which the stope is started from the raise. The raise contains a 4-ft. cribbed man-way with room on each side for the broken rock to come down. If the man-way is in the middle of the section to be stoped, benches are driven each way the full width of the ore. Only flat holes are drilled in the stopes since vertical holes tend to leave the back ragged and necessitate too much barring down of the back by hand. Placing the chutes close together in the drift allows a fairly good control of the top of the broken ore from which the next drilling is to be done. The maximum stoping width has been 60 ft. and the average of most of the stopes is 40 ft. No timber of any kind is used in the stopes and very little barring down is necessary. In nine years of operation no man has been injured by falling ground.

Drilling is done with standard drill steels; detachable bits have not been tried, for not much steel is required

to drill the rock. Only one shop man is employed, his principal duty being to sharpen the steel. The handling is simple. The steel is thrown into the stope from the level above and out of the stope to the level below. The distance between levels is 125 ft. No hand shoveling is done.

The ore broken in the stopes is drawn off from where it falls and the drifts are shoveled out with EIMCO loaders. The most difficult part of the operation is loading from the chutes of the shrinkage stopes, for in this system some of the rock breaks big and cannot be reached

25 percent and reducing the manual effort to get the cars out by a greater percentage. No skip pocket is used to dump into on the bottom level, but instead the cars are dumped directly into the skip. It is faster for our purposes than dumping into a pocket and then loading the skip from the pocket.

Pumping Problems Increase With Depth

Water has always been a serious problem. With each advance of the bottom level the flow of water increases. The water coming from over-



The ore is deposited in a broad zone in dolomitic limestone adjacent to quartzite beds. About half the values are disseminated—the other half are fracture fillings

The ore is broken down and drawn off enough so that the back can again be drilled and blasted. This process is continued until the level above or the top of ore is reached



from above with jackhammers. When these boulders get to the chute lips they have to be bull-dozed. This will probably be eliminated in future stoping by doing away with the timbering under the stopes, letting all the ore come to the sill of the drift and loading it with a mechanical loader.

Tramming was done by hand up to 1,000 ft., then a Mancha Little Trammer was put into operation, increasing the tons per man by more than

head drains quickly but in spite of this the flow that must be pumped from the mine continues in undiminished volume. The latest addition to the pumping plant is an Ingersoll-Cameron 5 GT with 100 h.p. motor that pumps from a large sump. The pump can be set to discharge just a few gallons per minute over or under the amount flowing into the sump, and thus allows the water level in the sump to either rise or fall slowly.

This permits the pump to run long periods without running out of water or the sump filling up. A red light comes on in a prominent place in the mill if the water level varies too much.

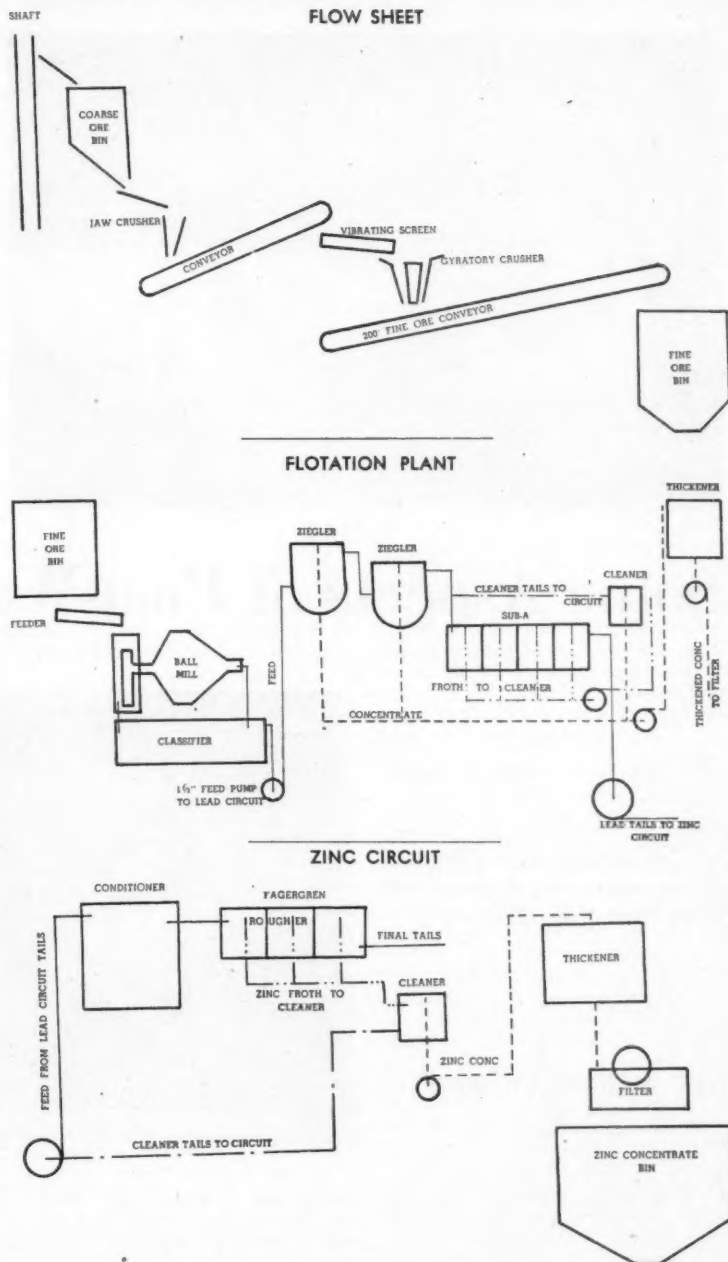
The discharge is also so arranged so that it can be seen without effort. This pump runs continuously without attendance except for inspections by the mine bosses during the mine shift hours. At times the pump runs without inspection for 36 hours except for observing the water flow at the surface. The smaller pumps which were formerly used are set up in the same station and will handle the water in case the large pump has to be shut down for any reason. These smaller pumps have 440-volt motors and the larger pump has a 2,300-volt motor. At the present time 600 gallons per minute are discharged at the surface. This is 30 percent less than the capacity of the large pump.

Crushing Operations are Simplified

The ore is dumped into a 200-ton capacity bin adjacent to the steel headframe. An 8-ft. steel lined slide leads the ore to a 9x15 Blake type crusher set to 1½ ins. The angle of the slide is such that the average ore moves from the bin down the slide just fast enough to keep the crusher full. When the crushing plant is running, one man attends this part of the operation to keep the ore moving if it is not average and to break rocks too big for the crusher. At times, when conditions justify, waste is picked as the ore moves down the slide. The crushed ore drops to a conveyor that carries it to a vibrating screen with ¾-in. square openings; the undersize drops to a second conveyor. The oversize drops from the end of the screen into a Traylor TY crusher which is set to crush as fine as possible. The crushed material drops to the conveyor and joins the material that passes through the vibrator. The conveyor carries the ore 200 ft. to the fine, or mill ore-bin. The crushing plant has a capacity of 300 tons per day and need be run not over eight hours per day. One man operates the crushing plant.

Flotation Plant is Arranged for Maximum Economy

The fine ore bin is set so that an impact pan feeder drops the ore into the ball mill scoop box. The feed is not weighed but the amount is determined visually in conjunction with the classifier density and the classifier return. The ball mill is an old cast 6x22 Hardinge mill from which the discharge goes to a 6x20 duplex EIMCO rake classifier in closed circuit with the ball mill. The ore is ground to 70 percent minus 200 mesh to free the disseminated Galena. The



classifier overflow is pumped to the head of the lead flotation circuit by a 1½-in. Gould sand pump. There are four of these pumps in the flowsheet, all alike and interchangeable. One pump is always ready for the interchange so that the replacement of any one can be made in a very few minutes without a mill shutdown. The pulp flows through the lead circuit in series and by gravity through two Ziegler machines and then through a four-cell Denver Sub-A. The Ziegler machines are novel. The tank is circular, they are sub-aerated, are

driven from the bottom like a washing machine, and the froth need not be cleaned as it is as good or better than the concentrate as shipped. The froth from all cells of the Denver and the froth from the cleaner joins the froth from the Zieglers and is pumped to a 20-ft. thickener. The tailing from the cleaner returns to the lead circuit at the head of the four cell Denver. The thickened lead concentrate is pumped to a two-leaf 4-ft. EIMCO filter, set over the lead concentrate bin so that the filter cake

(Continued on page 50)



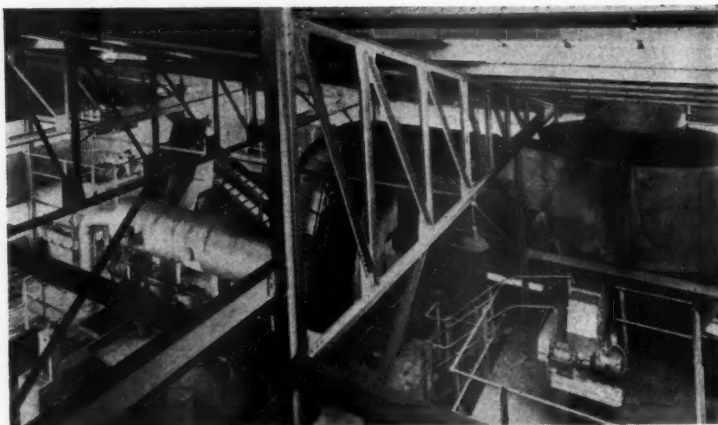
Even in mines of moderate tonnage, the advantages of double track main line or of frequent passing tracks, with block signals, will be recognized more and more as permitting speedier and less costly transportation

Some Aspects of Post-War Operation

Many Important Developments and Innovations are Forecast for Deep Coal Mine Operations

By **W. R. CUTHBERT**

Chief Engineer
The Valley Camp Coal Co.



Coal preparation plants, treatment and sizing equipment will be much more elaborate, after the war, than those we are now familiar with

OUR primary interest in the future, as production men charged with the responsibility of getting out coal, is in the equipment we'll have to produce it, the men to run that equipment, and how we'll manage the mines to get the cost we need for profitable operation. Tied in with these, is the necessity to produce a coal which is as clean as skill and machinery can make it.

With this in mind I will try to predict some of the equipment and methods to be seen in and around coal mines in the post-war period. In this I ask your indulgence, for those who try to peer into the future are

looking into a glass that's dark. I only present the picture as I see it; your conception may differ, perhaps, widely.

Face Preparation Will Improve

In face preparation I look for considerable advance. Cutting-machine operation will be less and less dependent on the strength and muscle of the runner; instead (and this trend is already noticeable) the back-breaking, fatiguing part of cutting will, so far as possible, be done by mechanical devices. The moving parts will more and more be totally guarded and enclosed; improvements in bits, chains, and bars through alloy steels and improved design will permit significant cutting speed increases and

greater bar lengths; tramming will be faster if we have the track to make it safe. Improved water sprays for bars are inevitable, with practically complete adoption in not too long a time. The use of wetting agents will increase, especially in those mines where water supply is a serious problem. I look for increased use of "gummers" and other similar devices to gather and pile or load the cuttings as delivered and so prevent their being pulled back into the kerf and pulverized. This will be very useful in those seams where quality demands that impurities be cut out and gobbled. Adjustable height shortwalls will have some field here for selective mining. In all, we'll have faster, safer, more trouble-free machines.

* From an address presented to the Monongahela Valley Coal Mining Institute, June 13, 1944.

Coal drills, at the face, will not be too much changed from present ones, except in providing greater safety for drill and operator, and in improvements and size changes designed to permit larger holes, to speed set-ups and reduce drilling time. Drills for very dry and dusty mines may have sprays. Where stone is drilled as part of the face cycle, some device for catching and disposing of the drillings to avoid contamination of coal will be useful. I look for considerable extension of uses for drilling underground; in some mines, it may be entirely possible to pre-drill two, three, or four cuts ahead, thus saving time through fewer drill set-ups and less tramming. Special plugs to confine the explosive force to the current cut will be necessary. Drilling ahead (in the coal) to bleed off gas ahead of advancing entries is feasible and we may look for it in mines where gas forces development to be slowed down. Such drilling may be horizontal from the face or verticle from the surface.

Exploratory drilling is anything but news, but look for great increases

the way inside. Substitutes for the "chemical change" type explosive, while offering some advantages in coarse coal and relative freedom from gas or coal dust ignition dangers, have other hazards peculiar to themselves and also definite extra costs in handling and loading as compared with permissible powder. The perfect explosive isn't here yet, so look for real advances in the art. We haven't heard the last of water infusion and the elastic cartridge, nor do we need give up the possibility of still slower permissibles, close to black powder in heaving effect as opposed to the pulverizing and breaking that go with fast explosives. Market trends to increasing use of smaller sizes may considerably modify present conceptions of what is desirable in an explosive.

Needed Loading Changes

Loading of coal continues to be an intermittent job with mobile loaders. Car or shuttle car changes, maneuvering, tramming, and all the various other delays, avoidable and unavoidable, contribute to this. Conveyor and scraper loading methods of today like-

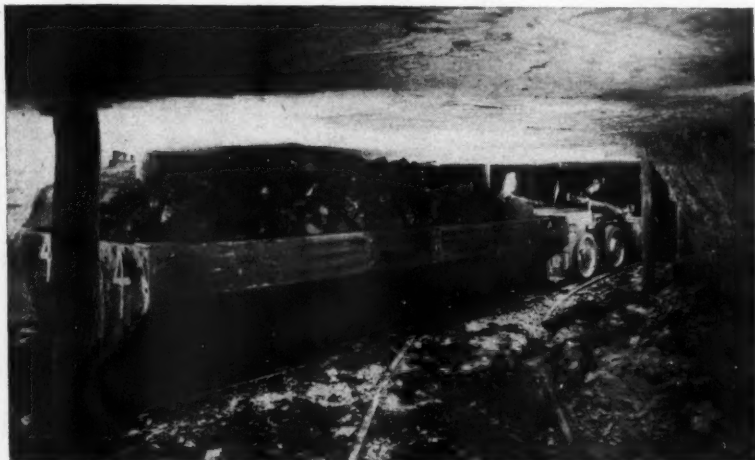
bering, cutting, drilling, blasting, and loading follow continuously at spaced intervals is not an impossible future ideal where natural conditions are reasonably favorable. Perhaps even a "mechanical mole," probably for entry driving, will combine all the operations at the face, chewing out the coal at one end and delivering the coal through itself out the other end. Indeed, one such machine drove thousands of feet of entry in Illinois, but its size and other features limited its application to mines with high coal. Mobile loaders of the "shelf loading" type have been installed in Alabama—look for more where selective mining requires them.

No discussion of face equipment would be complete without touching on wiring. We are going to see great improvements in cable, junction boxes, starting equipment, grounding, fusing, and other safety devices, partly due to stricter legal requirements, but mostly because the industry cannot afford to have anything but the best and safest at the face. Explosion-proof devices will be the common thing; wiring safety will be backed up by periodic rigid inspections and maintenance; connectors and boxes will be such that a hot connection and flash will be impossible.

Haulage Operations Will Undergo Substantial Advances

Transportation from face to out-side should witness considerable improvement. Starting with track, I feel that much track will be prefabricated—prebent, cut to predetermined length both for curved and straight rail to suit the particular layout; there will be quickly installed ties (both steel and composite), turnouts cut into sections to be laid down and fastened together rapidly and easily handled by two men. Main line track will be heavier rail for long life, with 80-lb. to 90-lb. rail not unusual; the welded joint will be found economical when speed and low equipment maintenance costs are considered. Treated ties, drainage, good ballast, good installation and maintenance will be more in evidence than ever before. Even in mines of moderate tonnage, the advantages of double track main line or of frequent passing tracks with block signals off single track will be recognized more and more as permitting speedier, and less costly transportation.

We can expect faster locomotives on main line service, and, in my opinion, some of these will be diesel driven. The fire hazard of thousands of feet of bare trolley and feeder, infrequently inspected and always subject to falls, would be eliminated by self-contained haulage units. For gathering service and back of mobile loaders, don't write off battery locomotives; quick-change batteries like



Tight, high-capacity designs with little waste space and favorable load ratios are the haulage cart of the future

in it both from the surface and underground—it will save time and money in those mines that have displacement faults or wants. The use of drill holes with inserted pipes to support roof at the face has been tried, and is now little used, but, in my opinion, has possibilities that deserve more investigation in mechanized mines requiring fast face advances under tender top. In such conditions on main headings, pre-grouting of roof through small diamond drill holes of considerable length is by no means a pipe dream.

Breaking down the coal presents interesting possibilities for improvement. Explosives always present hazards, not only at the face, but all

wise involve intermittent loading, often as a result of conflict with other face operations. Whatever the causes, this kind of operation represents a failure to use full loading machine capacity, and carried to its logical conclusion, means that our loading units are several times more numerous than would be required if a layout permitting continuous or reasonably continuous loading were possible.

This improvement may take several forms, including conveyors to make a continuous flow of coal from the loader, more tons per fall through deeper cuts and longer faces, shorter trams, quicker changes and completely integrated cycles of operation at the face. An operation whereby the tim-

those in shuttle cars, and the obvious advantages of freedom from cable worries are not to be disregarded. Here, too, the diesel locomotive, if fume troubles are licked, has obvious merits.

The rubber railroad, that is—the conveyor belt, has many advantages in mines and we may expect that main line belts will be increasingly adopted, especially in high capacity mines. There are, of course, many problems to work out, such as delivering supplies, stone handling and disposal, crossings, and the like. There is nothing to prevent such belts being a mile or more between centers through the use of multiple ply heavy duck or "built-in" steel cable to take the belt tension. In the West, as the public prints testify, big tonnages of sand and gravel for dam construction are hauled for many miles on a series of belt conveyors, some units being built with two-mile centers. Butt entry mother conveyors will continue to occupy an important place in production sections.

Economy in Good Haulageway Maintenance

Inherent in any of this high first cost, long-life transport system is its protection against delays and damage. Many mines start timbering their main haulways as the roof begins to go bad, and then carry on a cycle of timber maintenance, sealing, unloading, and retimbering as long as the entry is used. This is expensive work, and the roof condition always leaves lingering doubts about when haulage delays, fires from feeder arcs, or injuries will occur by reason of falls. I expect post-war mines, of reasonably long life and good capacity, to timber their main haulways and main belt entries permanently within a year or so after driving, this lag being needed to determine final grades before the permanent work is done. Some mines will use gunite, others concrete, brick, steel (both rigid and flexible designs), and possibly treated timber with various combinations; whatever the system, the objective will be safe, low maintenance haulageways for the life of the operation, built as quickly as possible after the permanent grade can be established. Some few fortunate mines may be able to protect their roofs merely by sealing them with one of the several preparations available.

Lighting on main haulageways will be better; cleanliness and safety will be stressed. Increasingly, haulageways will be kept free of coal spillage and refuse, and will be helped in this by lighter, stronger, better-built mine cars. Such road cleaning as is necessary may continue to be hand work, although mechanical road cleaners are certainly feasible if the savings justify their use. Clearances and refuge holes provisions will be

more rigidly enforced; with faster haulage this is certainly desirable. Signals, electric switchmen, dispatching, and trip scheduling will be in the picture more than ever.

Telephone communication inside will be improved and extended, but don't pass up carrier wave and radio communication possibilities. Electronics will help us in many ways, from methane alarms to roof testers.

Where haulage is by belt, adequate foundations, good lighting, correct grade and profiles, absolute protection against falls and other accidents, easily replaced and lubricated idlers, proper installation and training are among the important essentials. Because coal will be sprayed to keep down dust at the loading, dumping, discharge and transfer points, our rubber chemists must devise cover stock and carcass more capable of re-

attention; metallizing may enter the picture. Spring and rubber draft gear will be adopted much more as the lower maintenance and easy trip starting and movement they allow are better known. Rubber and spring cushioning of wheels, trucks, and axles may not gain such wide acceptance. But their use will grow.

More Slopes and Better Slope Bottom Equipment

The proportion of mines below water level will constantly increase, and I look for a continuation of the present trend to belt slopes. Slopes are naturally longer than the depth of shaft, but the use of mechanical loaders, scrapers, and conveyors in the sinking has so reduced the cost that, even including lining, the spread of cost between slope and shaft is reasonably small. The big advan-



The back-breaking, fatiguing part of cutting will in future be done by mechanical devices as far as possible

sisting moisture, mildew, and rot. A start has been made on this already, but perfection is still not reached.

End of the "Egg-Crate" Era

The trend in mine cars will be mixed; the method of mining, seam height, and other variables will continue to govern. Certainly, whatever the individual variations in design of new cars, the "egg crates" of the past are out. The tight, high-capacity designs with little waste space and favorable load ratios are the cars of the future. Look for increased use of automatic couplers back of mobile loaders; universal use of anti-friction bearings; extremely high capacity, especially where the cars are loaded by conveyor and don't go to the face; two-axle trucks; air and hydraulic brakes. The weight of cars will be favorably influenced by use of high strength alloys permitting thinner plates and shapes; corrosion resistance of car bodies will receive more

tages of slope belts lie in reduced power consumption by avoiding the power peaks which are inevitable in cage or skip hoisting, in steadier flow of coal to tipple, in having a lower maintenance type of equipment which is less likely to break down. I look for very few new cage type coal hoists, but skip hoisting will still have a place.

In both slope and shaft bottoms, I look for complete mechanization, with one man controlling all the operations from the time the locomotive delivers the loads until it picks up the empties. He will have all the aids ingenuity can devise, including electric-eye car position indicators and counters, hopper level indicators, "inching" drives for car hauls at both ends of dump, automatic weighing, check pulling and recording where weights are desired. These will all interlock so as to insure continuous operation free from mishaps and operators' mistakes, this latter by making

it mechanically and electrically impossible to do the wrong thing.

Because uniformity of product will become increasingly important at many mines, elaborate facilities for blending the several grades from the different sections of the mine will be provided. This will start at the dump where section dumping ratios will be observed, and continue through the cleaning plant to blending bins.

Coal Tailored to Order

In my opinion, preparation plants, treatment and sizing equipment after the war will be much more elaborate than those most of us are now familiar with. For one thing, the mechanical loading of coal, now at 40 percent, should rise to 75 percent; since mechanical loading usually produces a dirtier product than hand mining, most operators must install mechanical cleaning as part of their mechanization programs. As the more desirable, cleaner seams are exhausted, the trend to low coal and to seams with bands of bony and other impurities will also require more cleaning plants and a corresponding increase in waste handling facilities. Since we're in a battle for markets, be prepared to see your future coal tailored to the customer's order more than ever before; we'll screen, wash, dry, resize, crush, mix, and spray it to his taste. Our treatments will include not only the present usual dust prevention, but also compounds of various kinds to give fusion control, prevention of clinkers, smoke prevention, soot elimination, and to reduce the destructive effects of coal on grates, stokers, flues, breeching, furnace walls, boiler heating surfaces, etc. If our customer has a special problem, our combustion engineers must see to it that his coal gets special sizing and treatment to meet the need.

Power and Planning Problems

Power as a major cost will receive due attention. Higher A.C. voltage on distribution systems, ample wire size, capacitors and synchronous motors for power factor correction, energy metering at various points to check use, capacitors, arrestors, and other protective devices to insure low cost A.C. power supply with few interruptions will be increasingly used. On D.C., the trend to sectionalizing by automatic reclosing breakers should continue; adequate trolley feeders and returns are more necessary than ever before with mechanization, as are good load distribution and proper substation locations. Trailing cables and wiring generally will be upgraded. I look for the elimination of rotating conversion equipment in a relatively short time, this in favor of rectifiers which even today are more reliable and efficient than most motor-generator sets or

rotaries. Closer spacing of substations and their location near the load center enters the picture more and more.

Look for much more detailed and specific mine and operations planning than ever before, the scheduling of development and extraction, a proper balance through planning (based on full knowledge of mine operation) of all the elements that make up an efficient producing property.

That Future Manpower Problem

We have hitherto failed to mention that most vital feature of a going mine—manpower. What we will get for the mines out of the men returning from the services depends to some extent on what we will have to offer in living conditions, wages, and future. We can't expect to run our highly mechanized mines with old or even middle-aged men. Right now the high average age of many a mine force reflects itself in low tonnage per man, absenteeism, and injury. The younger men who are trainable and adaptable to modern methods are now in the armed forces—when they come out, coal mining must make itself an attractive occupation to get its share of them.

Given the men, what shall we do with them? Should we let them "pick up" their skills, with accompanying bad work habits? Isn't it better to find out first for what the man is best fitted, then give him all the training we can in that job so he does it our way, the way that fits in with the overall plan of operation?

We can't escape the cost angle; this involves a knowledge of what we should expect for a day's pay, a day's machine operation, and the like. All require measurement, time and motion study if you like, of each job or operation for the particular mine. Only thus can we set standards that are just to both men and company.

But even after a standard is set, we have the knotty problem of how to keep the efficient worker happy, while still giving the less efficient a living wage. To meet this problem I believe that operators and unions must sit down together, agree that all men are *not equal* whatever their status when created, and recognize the superior worker's extra production by giving him incentive pay over a guaranteed minimum base pay.

A large part of the foreman's job is to see to it that the employer gets value for his labor dollar. The high proportion of day men will require that the foreman be a leader, active, knowing mining and production thoroughly, a good manager and a good judge of what a day's work is. He will have to be mechanically minded. He can't become these by just getting a certificate and hanging a safety lamp on his person. The state, mining and technical extension courses, the operator, and practical experience must all combine with the intelligence and ambition of the man to produce the foreman of the future. What the proposed organization into unions will do to foreman's authority and prestige is difficult to predict—and I won't try.

Finally, look for increased rather than decreased "government in mining." Federal inspection of mines is probably here to stay in spite of complaints, a few justified, made about it. The mining laws of some states and the qualifications of their inspectors need upward revision to meet modern conditions properly, and will probably come if only to protect "states' rights." Portal to portal pay now has Supreme Court approval, so in spite of what you think of the merits of the decision, prepare to witness plenty of projects to cut travel time, from new back shafts, slopes and short-cut tunnels through the hill, to protected, roofed, special design

(Continued on page 52)



Where haulage is by belt, adequate foundations, good lighting, correct grade and profiles, absolute protection against falls and other accidents, are among the important requirements

Ventilation at the Newport Mine*

VENTILATION experts and others, who have had occasion to observe the system of ventilation used at the Newport Mine, have expressed themselves so favorably as to its merits that I have been asked to describe the system, in the hope that it may be helpful to other operators facing ventilation problems in their underground mines.

The Newport Mine is located near the City of Ironwood on the Gogebic Range, and is operated by Pickands, Mather and Company. It is a typical Gogebic Range mine, in that it has attained considerable depth; it extends in length across four forties. The ore bodies along this extent of footwall are relatively narrow, averaging around 90 ft. in width. At the present time there are two separate ore areas located at either end of the property, a fact which lends itself very well to this particular ventilation scheme. The sub-level caving system of mining is used throughout.

Mine Layout Described

In order that this description may better be followed and understood, a line drawing (Fig. 1) has been prepared, showing the principal features of the system, to which reference can be made throughout this paper.

The mine is served by two vertical shafts well back in the footwall granite. The Woodbury Shaft extends in depth to the 27th level, a distance of 2,535 ft., and the New Shaft to the 29th level, a distance of 2,850 ft. below the collar. This latter shaft has just recently been extended to the 30th level, an additional 266 ft. as shown, but the level has not yet been driven. These shafts are identical in design, having two skip compartments and two cage compartments, separated by a ladder way and pipe compartment, and having a cross-sectional area of approximately 240 sq. ft. The Woodbury Shaft is the supply shaft and emergency outlet, and is the downcast or fresh air source of the ventilation system, while the New Shaft is the production and man way shaft, and is the up-cast or exhaust opening of the mine.

The development of the mine has been planned with a view to supplying adequate and independent ventilation to each mining pillar, as well as for efficiency in conducting mining operations. It consists briefly in driv-

Methods of Conducting and Tempering Air at Large Northern Michigan Mine Provide Notable Advantages in Working Conditions and Operating Economy

By H. L. SHIEBER

Superintendent
Newport Mine

ing the main level drift on the footwall from which two-compartment cribbed raises are put through to the level above. These raises have a total cross-sectional area of 32 sq. ft. and are spaced at 300-ft. intervals along the orebody. The interval between main levels varies and is not material for the effective operation of the ventilation system.

Crosscuts are driven to the hanging wall from these main raises on 20-ft. sub-level intervals, as mining progresses downward, and slices are extended in both directions from these

crosscuts a distance of 150 ft. to the arbitrary pillar limits. Slicing and subsequent caving in each pillar begins on the hanging side of the orebody and retreats toward the footwall. The crosscut on the sub-level next below the mining sub in each pillar is driven in advance of actual mining requirements, and serves as a transfer sub. A branch raise is put through from this sub to the operating sub-level above for each slice as it is required, and the ore from that slice is scraped to this opening. It is then transferred to

the main raise by scraper, and loaded into cars on the main level from that point.

The footwall drift on the upper main level, being in the ore, will eventually be mined out and caved and thus block the air outlet. It must, therefore, be replaced at the proper time by a rock drift located far enough in the footwall to permanently serve as a supply road and fresh air source for mining the entire pillar to the main level next below. Connections are made to this drift from the oper-

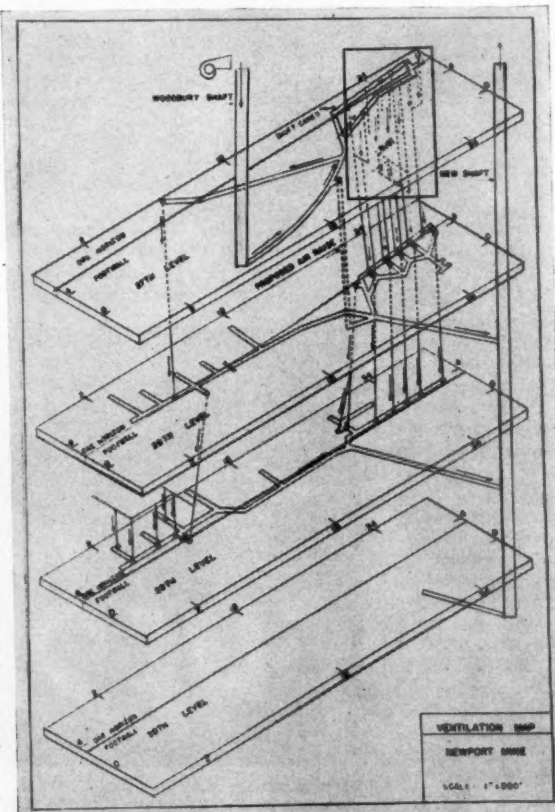


Fig. 1.
A diagram of
the principal
passageways
involved in
the ventilation
system

* Presented to the 21st Annual Conference, Lake Superior Iron Mining Section, National Safety Council.

ating sub-level in each pillar by driving a short rock cross-cut into the footwall and a raise to the sub-level above, which had previously been connected through in the same manner.

The slices in one pillar are not permitted to hole into the slices in an adjacent pillar. In this way each pillar is an independent unit, having its own opening to the level below and its own intake for fresh air from the level above. Blasting can therefore be done at any time in any pillar without affecting the miners in nearby working places, resulting in a considerable saving in time, which makes for increased miners efficiency. Normally there are two headings or working places in each pillar.

Ventilation Equipment

The main ventilating unit is located at the collar of Woodbury Shaft and consists of a No. 11 American High-Speed Fan, driven by a 60-h.p., 2,200-volt motor. An all-metal enclosure with large air locking doors is required at the collar for the passage of material to and from the cages, and a reversing box is built into this enclosure by means of which the air flow can be quickly reversed, should that become necessary.

This fan forces from 60,000 to 70,000 cu. ft. of air per minute through the mine, depending upon conditions of temperature and changing mine resistance, and allowing for a 10 percent leakage through the locking doors, which is a normal condition. This volume of air is more than ample for 100 men, which is the maximum crew in the mine at any one time.

Air is Heated in Winter

During the winter months provisions are made for tempering the air for the double purpose of preventing the accumulation of ice in the shaft and bettering the working conditions for the men. This is accomplished by the installation of six No. 180 Grinnell Thermoliers at the shaft collar within the enclosure. These are controlled by individual thermostats located 40 ft. below the collar and set in such a way that only those heaters required to maintain a minimum temperature of 35° F. are allowed to operate. These heaters have a capacity sufficient to raise the temperature of 43,000 cu. ft. of air per minute from -40° F. to +40° F. However, since the average minimum winter temperature in this district is around +5° F., the capacity of the heaters is ample for tempering the full capacity of the fan with the exception of rare instances when very low temperatures are recorded. In these instances the volume is reduced temporarily by restricting the size of the intake opening.

Steam is supplied to the heaters by an automatic stoker-fired Kewanee

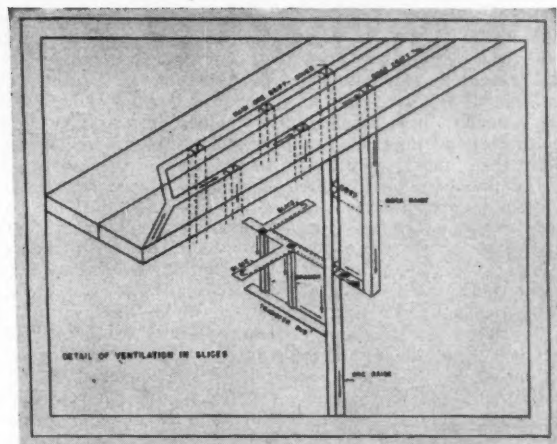


Fig. 2. The main raise in each pillar becomes the permanent fresh air base

boiler, located in the Woodbury shaft house, adjacent to the collar enclosure.

Fresh air leaves the Woodbury Shaft on the 27th level and is split as shown, at the intersection of the West Ventilation Drift and the main shaft crosscut. A proportionate part takes a course west through the ventilation drift and thence through a system of raises to the working area between the 28th and 29th levels. It continues downward through the various pillar openings to the 29th level and thence to the New Shaft. The other split takes a course to the east through the 27th Level Footwall Rock Drift, where it is apportioned equally, as nearly as possible, to the six operating pillars. This is very simply regulated by restricting the raise openings as required. It then continues to the 28th level through the raise system and thence to the New Shaft, where it is exhausted from the mine. When mining progresses below the 28th level in this area, it will be necessary to drive the ventilation raise shown, between the 28th and 27th levels, after which the 28th level rock drifts to the east and west will carry the incoming fresh air and distribution will be made on that level in the same manner as explained above on the 27th level.

In order to minimize resistance in the raises conducting the air through the various pillars, the collars and gates necessary for safety are constructed of heavy wire mesh, which offers little or no obstruction to the air flow.

Pillar Ventilation Details Important

Fig. 2 is an enlargement of that portion of the system contained in the small square in Fig. 1 and shows better detail of the individual pillar arrangement. With this system of distribution, the main raise in each pillar becomes the permanent fresh

air base, and it is only necessary to conduct the fresh air from this point to the working face. This is readily accomplished by installing a 2-h.p. auxiliary fan at the main raise for each working place, and extending 12-in. ventube to the working face. As mentioned previously, the orebody averages around 90 ft. in width and the slices in each direction from the main crosscut have a maximum length of 150 ft.; therefore, the longest distance from the auxiliary blower to the face is about 250 ft.

Approximately 2,000 cu. ft. of air per minute, which is considered more than ample for two men, is delivered to the face at this distance through 12-in. tubing. The tubing is customarily kept within 25 ft. or less of the working face, and the fan is kept in continuous operation throughout the various mining cycles, so that it serves to reduce the dust hazard by dilution while drilling and scraping, and to quickly remove the smoke and dust from the place after blasting.

To facilitate the quick removal of smoke and also to prevent recirculation of contaminated air to the fan at the main raise or fresh air base, the main raise opening is blocked at the floor of the operating sub. The branch raise at the head of the slice now becomes the down cast opening to the transfer sub below, and the contaminated air takes that course. On the average, it requires 15 minutes to remove all smoke and dust from a heading after blasting, to a degree where no hazardous dust concentration is found present.

This auxiliary ventilation bears the entire burden of dust control in the mining places and so effective is it that wetting down or spraying in the place has been found to be unnecessary.

Solving Fire Protection Problems

With the installation of electrical equipment such as these auxiliary

fans and controls, an additional fire hazard is introduced, especially when located in the heavily timbered openings usually necessary in sub-level caving. To guard against such an occurrence, several precautionary measures have been adopted: A covering of light sheet metal is placed around the fan motor to protect the nearby timber or lagging against the possibility of becoming ignited from sparking or flashing across the armature or brushes; the control circuit breaker is mounted on a backing of asbestos board to protect the timber, on which it is usually placed, from a possible short circuit in the breaker; a short section of $\frac{1}{2}$ " fire hose is permanently attached to the water line on the fresh-air side of the fan. This hose is equipped with a rubber covered nozzle to protect the operator, should it be necessary to direct the stream onto a live circuit, and the hose connection is brazed permanently to the stop-cock or valve in the water line to guard against its removal for other purposes.

Special Considerations

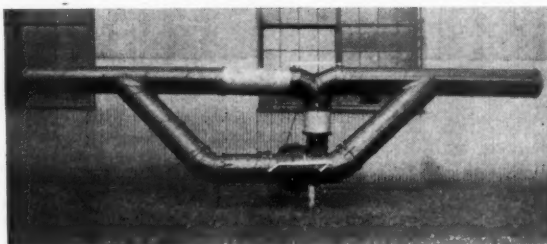
It was mentioned earlier in this paper that the existence of two separate orebodies at opposite ends of the property was a favorable situation for this ventilation scheme. Splitting the main air supply in two parts on the top intake level and bringing them together again at a central point on the bottom or main exhausting level, has several distinct advantages over other systems of distribution. In the first place, it makes possible a more equable distribution of the available air to each pillar because of lessened mine resistance, and what is much more important, in case of a mine fire, anyone caught on the exhaust side of the fire has only to travel to the point where the air streams join on the exhaust level to get into fresh air, and from that point access to the emergency outlet can be made in perfect safety.

Reversible Fans Speed Progress in Rock Headings

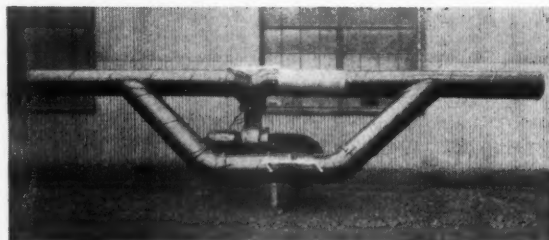
In rock development headings the problem of ventilation is considerably more involved, and special attention has been given to this type of work. Because of the possibility of high concentrations of silica dust during the drilling and mucking cycles, no less than 3,000 cu. ft. of air per minute is required for a 9x10 opening to accomplish a safe dilution so that airline respirators, which are awkward to wear at best, can be dispensed with. For this purpose a 15-h.p. high-speed, high-pressure fan, which normally delivers around 5,000 cu. ft. of air per minute, is used. The air is delivered to the face through 16" diameter tight metal pipe. Because of the heavy blasting usually necessary in rock headings, it is not feasible to

keep the pipe closer than 50 ft. from the breast because of the probability of damage from the blast, but the high velocity of the air is found sufficient to sweep the face effectively from that distance. A section of 16" flexible tubing is sometimes attached to the end of the permanent pipe to direct the flow of air to the point desired for best results. This can be removed when blasting. It is essential that pipe with air-tight joints be used in an installation of this kind, because of the high pressures under which the air is delivered. Leaky joints dissipate this pressure rapidly with the result that the volume of air delivered at the breast is reduced at a rapid rate, and the system soon becomes ineffective unless booster fans are installed at frequent intervals. It has been found that

ing the dust count at the face of the heading, but after blasting it is reversed to the exhausting position. A water blast is then directed into the heading, which serves the multiple purpose of thoroughly wetting the muck pile, dissolving some of the gasses and of driving the smoke from the face to the exhaust pipe opening. This method of removing the smoke from the heading has two distinct advantages: First, it removes the smoke 25 percent faster, which is very important from an efficiency standpoint, and second, the drift is permanently free from smoke so that other men working on the level, such as trackmen, pipemen or electricians, may resume their work with a minimum of delay. After the smoke has been exhausted, the fan is again reversed to the blowing position, and the slight



Left: Single fan reversible unit for 16-in. pipe lines under 2,000 ft. in length



Right: Two-fan (in series) reversible unit for 16-inch pipe lines from 2,000 ft. to 4,000 ft. in length

one fan will deliver 3,000 cu. ft. of air per minute at a distance of 2,000 ft. through a 16" pipe line which is free from leaks. When a heading is advanced beyond that distance, a second fan is installed in series with the first, after which an additional 2,000 ft. of advance can be made with the same effective results.

The installation is made reversible by the application of a system of valves and tees, which can best be shown by the photographs. The first picture shows the reversing set-up when one fan is used, and the second when two fans are connected in series. It will be noted by the indicator on the end of the pipe, that in these views the air is blowing toward the left. In both arrangements, the air flow can be reversed by the manipulation of the two tandem valves, and the blower then becomes an exhaustor, as shown in the next two slides.

During drilling and mucking, the assembly is set in the blowing position, which is the most effective in lower-

haze in the heading quickly removed.

Economic Conclusions

As a concluding statement, it may be mentioned that the maintenance of this ventilation system costs an average of 3.5 cents per ton on a production of 500,000 tons of ore per year. The items entering this cost are such material costs as auxiliary fans, switches, power, coal for heating, flexible tubing and metal pipe, and the labor costs for servicing the equipment and installing the fans and tubing in the various working places. However, if as little as 15 minutes per shift is saved in each working place by the rapid removal of smoke through good ventilation, this cost is offset by the increase in overall efficiency resulting therefrom. It is apparent, therefore, that a good system of ventilation is a sound investment economically, to mention nothing at all of the intangible advantages such as more healthful working conditions, better control in case of a mine fire, and others which are so obvious.

Governors' Conference Outlines Western Mining Needs

Report to the Governors of the Eleven Western States and South Dakota of the Proceedings of the Conference of Western Mining Delegates Appointed By Said Governors, Held at San Francisco, Calif., August 10 and 11, 1944

PURSUANT to the invitation issued by Governors Warren of California and Carville of Nevada, the official delegates appointed by the governors of the eleven Western States, and South Dakota, convened at the Sir Francis Drake Hotel in San Francisco on August 10, 1944, and remained in session during August 10 and 11. The conference was addressed by Governor Earl Warren of California and Governor E. P. Carville of Nevada. Both of these executives emphasized that the principal motive in calling the conference had been to ascertain whether any changes in the existing laws and regulations affecting mining should be made, and whether any new laws were necessary, in order to enable the mining industry to do its full part in the reconversion of the nation from war to peace, and in making available the maximum economic employment of men in the mining industry. Also, both governors stressed the fact that the war had brought about many new industrial developments in the West embodying the use of ores, metals and non-metallic materials which constitute so large a part of our western national resources. The desirability of retaining these ore plants and the extent to which such retention would benefit the mining industry was also commended to the attention of the delegates. In all of the deliberations these objects were borne in mind, and the effect of each resolution introduced and the necessity for the changes which it contemplated were carefully considered in the light of these primary purposes of the conference.

The states represented at the conference by officially appointed delegates, and the chairman of each delegation were as follows:

Arizona: T. G. Chapman, chairman—director, Arizona Bureau of Mines; George A. Ballam, field engineer, Department of Mineral Resources; Clifford P. Carpenter, Arizona Small Mines Association, and Charles H.

Dunning, director, Department of Mineral Resources.

California: Philip R. Bradley, Jr., chairman, lode gold mine operator; William C. Browning, lode gold mine operator; George W. Hallock, hydraulic mine operator; William W. Mein, Jr., cement industry, and F. C. Van Deirse, dredge operator. (All delegates are members of State Mining Board.)

Colorado: Robert S. Palmer, chairman—executive secretary, Colorado Mining Association.

Idaho: Harry W. Marsh, chairman—secretary, Idaho State Mining Association; James Bradley, manager, Bradley Mining Co.; Arthur Campbell, state mine inspector, and Edward L. Levine, Association Mining Company.

Montana: Carl E. Trauerman, chairman—secretary-treasurer, Mining Association of Montana.

Nevada: E. J. Schrader, chairman—consulting engineer; William M. Donovan, mining operator; Paul Gemmill, mining operator; P. A. Keegel, consulting engineer; Jay A. Carpenter, director, State Bureau of Mines; Robert Allen, state highway engineer, and Henry M. Rives, secretary, Nevada Mine Operators.

New Mexico: Vincent J. Jaeger, chairman—State Planning Board.

Oregon: Fay W. Libbey, chairman—director, State Department of Geology and Mineral Industries; Arthur Kent, tax specialist; S. H. Williston, member of Oregon Governing Board.

South Dakota: Guy N. Bjorge, chairman—manager, Homestake Mine.

Utah: A. G. MacKenzie, chairman—manager, Utah Metal Mine Operators Association; Kuno Doerr, Jr., assistant manager, Utah Department; A. S. & R. Co.; Tom Lyon, assistant manager, International S. & R. Co.; J. R. Mahoney, director, Economics Research Department, University of Utah; E. M. Royle, chairman of Utah State Industrial Commission.

Washington: Sheldon L. Glover,

chairman—supervisor, State Division of Mines; C. O. Dunlop, president, Northwest Mining Association; James L. Leonard, Northwest Mining Association; Milnor Roberts, dean, University of Washington, School of Mines; C. Sanford Thayer, manager, Alco Plant.

Wyoming: Henry G. Fisk, director, Utah Natural Resources Research Institute.

The conclusions of the conference are embodied in recommendations. Each of these recommendations was based upon a separate discussion and vote, the voting being done by states and with unimportant exceptions being entirely unanimous in favor of the recommendations. The several recommendations are as follows:

The Production and Marketing of Gold

War Production Board Order L-208

In the opinion of this conference, War Production Board Order L-208, singling out gold mining as the sole American industry to be closed down during the war by government order, never was justified. Incontrovertible facts showing such lack of justification were available to and should have been known by the War Production Board at the time the order was promulgated. The order never accomplished its stated purpose of diverting man-power and materials into strategic metal mines. The needs of post-war employment require that jobs be available in the gold mines and dredging operations so soon as the man-power shortage ceases. In order to enable mine operators to prepare for resumption of operations, Order L-208 should be rescinded now and, pending the effective date of such rescission, the War Production Board should adopt a liberal policy of permitting individual mines to produce enough gold bullion to return their maintenance costs.

Gold Mining Not a Non-Essential Industry

The practice of constantly referring to the gold mining industry as a "non-essential industry" which for some time has been and still is currently emphasized in bulletins, press-releases, directives, and regulations issued by the War Production Board, War Manpower Commission, and Office of Price Administration, casts an

unjust reflection on an industry which furnishes the sole important source of peacetime employment and major source of local business in over 19 counties in California, practically all the counties of Nevada, Idaho, and Colorado and important parts of Oregon, Washington, Utah, Arizona, Montana, South Dakota, New Mexico and Wyoming. Without desiring to detract or draw from man-power or materials actually used or useful in the war effort, we demand that these government agencies cease this unjust discrimination against our industry as compared with other peacetime industries who serve no more useful purposes in wartime, and accord us our fair share of labor certifications and material priorities necessary to permit operation under existing limitations of Order L-208.

Foreign Markets for Gold

It is currently reported that the free market price for gold in India, North Africa, and Asia Minor has fluctuated between \$40 and \$80 per ounce, and that mines in the British Dominions are enjoying that price for their product; and this meeting of mining representatives from the Western mining states believes that restoration of the ability of American gold mines to produce gold at the earliest moment consistent with war man-power demands, is essential to the preservation of the local economies of the districts in which they are located, to post-war employment opportunities for miners and prospectors, to the maintenance of an adequate national currency backing of gold, and to the stabilization of international money exchanges on a basis that will permit of the free resumption of international trade after the war. We believe that the President and through him, the Secretary of State of the United States should be memorialized to take such steps and enter into such negotiations as will make free markets for gold in foreign countries available to American gold producers, and will remove current legal restrictions on the export of newly mined gold to such markets by American producers.

Monetary Policy

We advocate the use of gold and silver in the International Fund and also in the International Bank, proposed at the Bretton Woods Conference of 44 nations or in any other international monetary program. We believe that the American people are in favor of a sound monetary system, safeguarding their interests against paper inflation. Printing press currency is not desired by the average American, nor does he want the currency of the United States debased by any international group of "experts."

Experience of the world with green-

backs after the Civil War, and with worthless German marks after World War I, was disastrous and caused a lack of confidence in any "managed currency" plan.

Stockpiling

It is imperative to the continuation of the mining and smelting industry and post-war employment of the maximum number of employees possible, that (1) all government owned stockpiles of strategic or critical metals and minerals and all government owned or controlled non-ferrous scrap metal shall be frozen at the termination of European hostilities, and that (2) all reverse lend-lease and preclusive purchases of metals and minerals should be added to such frozen stockpiles, as failure to do so means the stagnation of the mining industry of the United States.

These reserves of critical or strategic metals and minerals should be kept inviolate for future war emergencies and must not be released except by Act of Congress.

Premium Prices and Marginal Mines

The higher prices for newly mined metal and also the additional premium payments should be continued until such time as operators can recover their capital investment, especially those stimulated to produce for

the war effort. But in no event should these higher than normal prices and premiums be in effect longer than one year after cessation of hostilities, and the present expiration of the premium price plan should be extended to July 31, 1946.

Premium metal prices were established by the government as a production incentive. They are not, and should not be construed to be revenue of the mining companies in the computation of state taxes.

Tariff

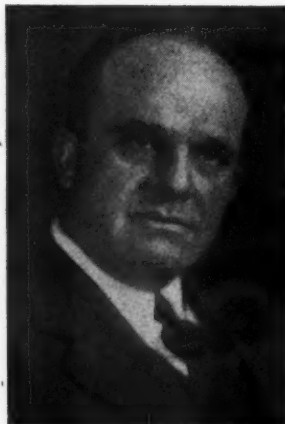
We oppose any reduction of tariffs on metals or minerals either directly or indirectly as such action would result in decreased mining activity and consequent drastic reduction of employment in the western states.

The imposition of moderate tariffs or slight increases in certain instances would provide materially increased activity and employment.

Any suggestion that the United States can not develop supplies of strategic metals and minerals under satisfactory incentive conditions should be rejected. A healthy industry is required to assure the nation of a sufficient supply of metals during another emergency. Any tariff reductions which would destroy any part of the mining industry would make

Right—Governor Earl Warren,
of California

Below—Governor E. P. Carville,
of Nevada



Governors Warren and Carville issued the invitation to the Conference and participated in the proceedings

the future supply of minerals in a national emergency most hazardous.

Freight Rates

We recommend: (1) That the existing statutes authorizing the railroads, in the first instance, to initiate and establish freight rates, subject to the supervision of and regulation by the Interstate Commerce Commission and the various State Rate Regulating Authorities be maintained in lieu of the provision appearing in any of the bills now pending before Congress that are opposed thereto. (2) That the railroads and rate regulating authorities are urged to recognize and adopt a procedure of rate-making that will have the effect of encouraging the development of manufacturing and industrial expansion in the western states.

Mine Finance

We recommend that a Central Publicity Committee be established and financed pro rata by the 12 western states here represented to nationally publicize the importance to the nation, of the mining industry of the West in: (1) Providing employment, (2) providing national security, and (3) encouraging investment in mining by the public.

We recommend to our governors that they call a conference between mine operators, underwriters of securities, and members and representatives of the Securities and Exchange Commission to determine measures necessary for modification of the S. E. C. regulations and to facilitate financing of mining enterprises by sale of securities to the public.

We recommend that Reconstruction Finance Corporation make immediate loans for the purpose of rehabilitation of mines closed under Order L-208 and to provide funds for the current upkeep and protection of the owner's equity.

Access Roads

We endorse the present Public Roads Bill now before Congress as to the provision for mine to market roads in post-war years.

Labor Laws—Limitation on Back Pay Orders

In the opinion of this conference undue hardship has been imposed upon the mining industry through retroactive back-pay orders of the National Labor Relations Board, the Federal Wage-Hour Administrator, and the War Labor Board. The interests of labor will be adequately protected if a limitation of six months from dates of orders be placed by law upon the right of these tribunals to impose retroactive back-pay orders. Mine operators will be protected by such limitation against confiscatory administrative orders which the courts have generally refused to modify, even when

violations of the labor laws may have been found which were unintentional, or made in good faith reliance upon a construction of the statutes or regulations at variance with subsequent administrative interpretation.

Taxation

Drastic alteration in the Federal tax laws and their administration is essential to the development of new mines and to the maintenance of production and employment in existing mines at a satisfactory level.

Prompt revision of the Federal income tax laws must follow the conclusion of hostilities. Otherwise, a speedy and orderly return to a productive and stable peacetime economy based upon American principles of free enterprise will be impossible. The necessity for large revenues will continue after the war and the mining industry recognizes its obligation to bear its fair share of the necessary costs of servicing the national debt and of efficient and economical administration of the government. These costs can be met and the Federal budget balanced only if taxes are imposed for the sole purpose of providing revenue and are levied in such a manner as to preserve individual incentive and encourage the investment of risk capital in the production of new wealth and the expansion of employment. Only in this way can the American standard of living be maintained and improved and national solvency be assured.

The excess profits tax must be quickly repealed upon the termination of the war. This tax penalizes efficiency, deadens incentive, and imposes an arbitrary ceiling upon the rewards of productive effort which, if continued into peacetime, will do mortal injury to our system of free private enterprise.

Other corporate taxes should be reduced as much as fiscal necessities will permit and so simplified as to eliminate the burden of multiple returns and reports. The capital stock tax and related declared-value excess profits tax should be repealed. The crushing discrimination against business corporations worked by existing tax laws must be removed. The present unjust double taxation of corporate earnings should be ameliorated by some system of credits or by the partial exemption of corporate dividends, in order that shareholders of corporations, whether large or small, may be permitted to receive a fair share of corporate profits.

The taxation of capital gains at high rates and arbitrary limitations on the deduction of capital losses effectively discourage the investment of risk capital in new enterprises. This is especially true in mining enterprises in which the hazards of loss are great. A ceiling rate of not more

than 15 per cent should be provided in the case of long-term capital gains and arbitrary limitations upon capital losses should be removed.

Adequate allowances for depletion are essential to the preservation of a sound and dynamic mining industry. Such allowances, including percentage depletion, should be preserved in any revision of the tax laws. The administrative simplicity of the percentage method of depletion is seriously threatened by hypertechnical administrative interpretations and procedures, the apparent tendency and purpose of which is the reduction of the depletion base. Wherever necessary, clarifying legislation, such as the recent amendment defining gross income from the property, should be enacted to nullify arbitrary bureaucratic action in derogation of legislative policy and intent.

Section 122 of the Internal Revenue Code, relating to the net operating loss, should be amended so as to eliminate certain limitations which work serious and invidious discrimination against the natural resource industries.

The present opportunistic administrative policy of retroactive revision of rates of depreciation is unfair and disturbing to the fiscal stability of industry and should be revised.


The present policies and procedures of the Bureau of Internal Revenue in the administration of claims for relief under Section 722 of the Internal Revenue Code are antagonistic to the spirit and purposes of this equitable provision and should be drastically modified. Elaborate instructions which have been given to field agents to guide them in the processing of these claims should be published and thereby be made to run the gauntlet of free criticism.

All internal revenue directives and instructions to field agents as to policies to be followed in disposing of taxpayers' cases should be made public.

Public Land Policy

This conference strongly disapproves the reported policy of the General Land Office in initiating proceedings to have mining locations held void for lack of discovery, where they are made on the unreserved public domain by locators who believed in good faith that they contain valuable metals in mineable quantities and have been prevented by war temporarily or other conditions from perfecting their discoveries. The Taylor Grazing Act should be amended to prohibit the initiation of such contests by the General Land Office for the benefit of grazing land lessees, and the latter should be relegated to the courts for protection if they believe their rights have been infringed by mineral locators.

(Continued on page 36)



Most mining operations are similar . . . and that is why the same types of Joy Equipment are being adapted for use in practically all types of mines. Below we give a few examples.

Works above ground as well as below

Wherever ore, rock or coal needs to be loaded, Joy Loaders will do the job speedily. Their use is not limited to underground operations, for they work equally well in surface strip mines or loading at stockpiles.

Joy mechanized mining equipment is versatile!

Driven by heavy-duty batteries



In coal mines particularly, where danger of a spark is ever present, Joy Shuttle Cars, battery operated, can do wonders to speed up production. Here is a 42" Joy Shuttle Car being loaded by a Joy 7 Bu. Loader.



Combination cable reel and trolley shuttle car



This Joy 42" Shuttle Car gives section haulage to the main trolley track by means of the self-winding cable reel. The cable can be detached and the remainder of the trip accomplished from the trolley wire power.

JOY MANUFACTURING CO., FRANKLIN, PA.

Consult a Joy Engineer

Governors' Conference

(Continued from page 33)

We condemn without reservation the arbitrary and illegal withdrawal by executive order of vast areas of the public domain from universal entry, by various divisions of the Department of the Interior. Such action prohibits the development of new mines and destroys all possibility of increased employment in the industry. We oppose the provisions of U. S. Senate Bill 736 and any other bill introduced or that may be introduced containing similar provisions or objectives.

Federal and State Bureaus

To avoid continuance of the duplication in mining investigations between government bureaus and agencies, and with state bureaus, we recommend that the fields of the older government bureaus be sharply delineated and the overlapping work of the other agencies be curtailed. We specifically recommend that for work of proper Federal character the United States Geological Survey be given supervision and charge of the geological and mineral investigations and the United States Bureau of Mines of mining proper, including statistical and mine-safety work and mine-operating problems, also beneficiation and metallurgical investigations.

Considering the present national debt and in contrast the present large accumulation of post-war funds in state treasuries, we suggest that the governors of the states be urged to make recommendations for larger appropriations for geological and mining work within their states by their own bureaus, or in certain states where successful cooperative programs with

the U. S. Government are being conducted, a continuation or enlargement of those programs.

We commend collaboration between Federal and State bureaus for the purpose of utilizing the special functions and qualifications of each party, and making an exchange of information in order to avoid duplication of effort. However, we deplore the proposed plan to have the United States Bureau of Mines establish in each state an office and staff that would duplicate if not usurp the field of State bureaus.

Availability to the States of Government Records Pertaining to Mining

Since valuable geological and engineering reports of great importance to each state have been made by the various Federal bureaus and agencies on prospects and mines in our states, which are now considered confidential, we urge a congressional act that will make available to each state all geological and mining data collected by the Federal Government in the state during the war period due to expenditure of government funds, but not to include confidential information furnished by operating companies.

Disposal of Basic Defense Plants

We favor an orderly transition from government ownership to private ownership and operation for all present government-owned "war plants," but only on a sound economic basis; and that this process or changeover be done in such a way and at such a time as not to interfere with national security.

We urge that before a plant is shut down or its production curtailed prior to ultimate sale or disposal, due consideration should be given, insofar as possible, to the overall economics of

such change; that such change be made, when possible, only after a thorough-going survey by competent disinterested, nonsectional, nonpolitical engineers and specialists.

We favor outright sales of such war plants to private industry whenever they can be made in harmony with public welfare. Plants and equipment of potential post-war value which may be found to be unsalable in the immediate post-war period, except at sacrifice prices, should be leased for private operation until economic conditions governing their ultimate actual value can be determined. Leases should be made with the objective of putting the facilities into useful operation and as a means of testing the market for the product. Leasing policies may also be employed to keep in working condition those plants which may be needed in future military programs.

Fully appreciating the comprehensive scope of the recommendations of the delegates, this report with all of its recommendations is respectfully submitted to the governors of the eleven Western States and South Dakota, in the hope that they will find in it a definition of the policy which will fill the needs of the mining industry, which will enable it to most effectively contribute to post-war conversion and rehabilitation of industry, and which will meet with the approval and support of the Western Governors' Conference in all steps necessary to carry it into effect.

Respectfully submitted,

PHILIP R. BRADLEY, JR.,
Chairman of the Conference.

WILLIAM W. MEIN, JR.,
JAY A. CARPENTER,
Secretaries.



Golden Gate Bridge, San Francisco, Calif.

Underground Gasification of Coal

—With Reference to British Coal Measures*

IN 1868 Sir William Siemens wrote: "From the fact that the gas producers may be at any distance from the furnaces that they supply if they are only at a lower level, it would be perfectly practicable to erect them in the very coal mine itself, burning the slack and waste coal in situ (in place of leaving it in the workings as is now often done) and distributing the gas by culverts to the works in the neighborhood instead of carrying the coal to the different works and establishing special gas producers at each. In rising to the mouth of the pit, the gas would acquire sufficient pressure to send it through several miles of culvert." This quotation seems a fitting introduction to the subject, not only because it shows that the possibility of underground gasification was considered by the man who brought the gas producer into industry, but still more because it gives a very accurate forecast of the limits of applicability of the method.

Professor Mendeleeff in Russia (1888) and Sir William Ramsay (1913) also considered the possibility of gasifying the coal underground but neither appears to have gone beyond making the bare suggestion.

Russian Methods

The subject of underground gasification of coal has caused considerable speculation, and during the last ten years extensive experiments and full scale trials have been carried out in Russia to bring this suggestion to a practical stage. The methods described in the literature fall into four main groups:

(a) *The Chamber Method.* The first method to be tried was to mine a whole panel of coal by the normal means and leave the broken coal filling a roughly square chamber of the same height as the seam. Air was supplied to the middle of one side of the square, the coal ignited and the gas piped off from the middle of the opposite side. The method failed, the calorific value of the gas obtained being only 70-115 B.Th.U./ft.³. As soon as an appreciable part of the coal was gasified the rest settled down and the gas by-passed over the top. If the gas could be made to flow vertically upwards through a bed of fuel which was tall in relation to its width,

Review and Comments on Methods Employed and Advisability of Applying Similar Techniques to British Coals

By M. W. THRING

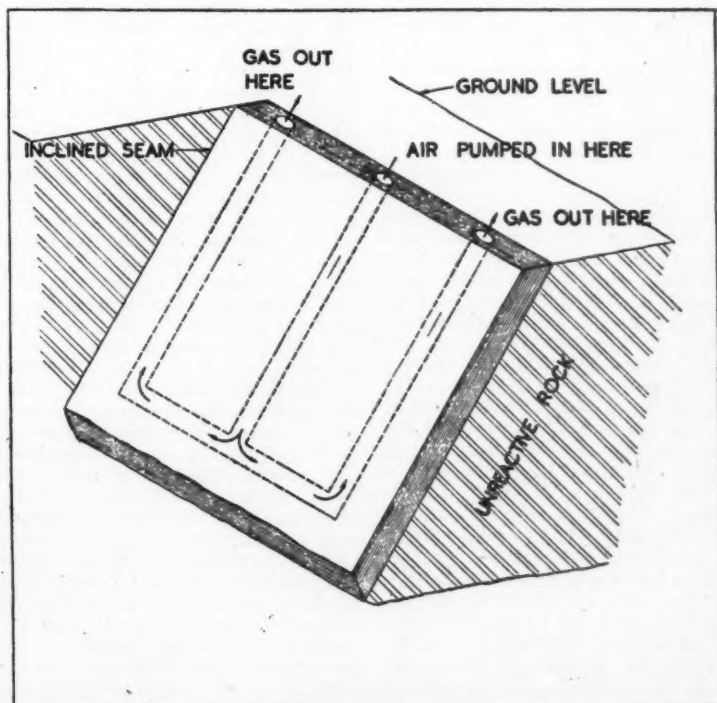
of the Scientific Staff, B. C. U. R. A.

it would be possible to gasify most of the coal in the chamber but this could not be done within the confines of the seam. The method therefore represents rather a poor attempt to construct a gas producer down a coal mine.

(b) *The Sloping Seam Method.* In Russia, seams sloping as much as 70° to the horizontal provide a natural arrangement which enables gravity to operate in such a way as to cause a reasonably good contact between the gas and the fuel. For such seams a method has been developed whereby

the coal can be gasified without breaking it at all and this method appears to be the only one which has proved really practical; gas has been produced from the experimental plant at Gorlovka for 1½ years without interruption.

In a seam sloping steeply up to the surfaces of the ground, three slants are driven down from the surface, parallel to the bedding plane, spaced about 200-300 yds. apart. When a depth is reached such that about 10,000 tons of coal is enclosed between the shafts, the latter are connected



The sloping seam method appears to be the only one which so far has proven at all practical

* From Bi-Monthly Bulletin, Vol. VII, No. 6, British Coal Utilization Research Association.

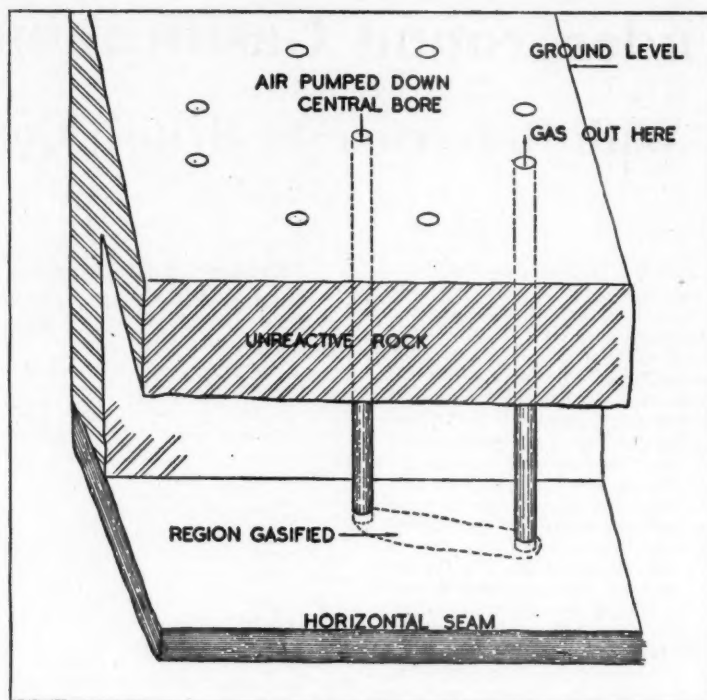
by a horizontal cross-gallery at the bottom. This gallery is filled with combustible matter which is ignited and air is then blown down the central slant and the resulting gas drawn off from the two side slants, through pipes connected to the ends on the surface.

As the coal burns, the open region through which the gas flows, travels up the panel, partly because the coal above is consumed, and partly because this coal and the overlying rock, collapse and fill up the lower side. The gas is thus made by the contact between the oxygen and the face of coal above it and broken coal below as it passes along the tunnel, but the two sides are inert rock. The region may be compared to a void in a fuel bed which is of very large cross-section but which partly makes up for this by its great length.

It has been found that if air is blown for about four hours a producer gas of calorific value 115 B.Th. U/ft.³ is produced. If then the blast is removed and gas drawn under a partial vacuum from the outlets, a much richer gas is obtained, the volume, however, being only about 1/4 of that produced during the blow period.

(c) *Parallel Gallery Method for Horizontal Seams.* Two parallel horizontal galleries, 2 ft. in diameter are driven through the seam from an existing working about 100 yards apart and they are lined with steel. These galleries are connected every 5 yds. by holes drilled by means of high pressure water across the seam near the bottom. The ends of each of these holes except the first, are blocked. Air is blown through one gallery and allowed to pass across through the first hole to the other gallery, and the coal is ignited in this hole, the gas from the second gallery being piped to the surface. The coal all around the hole is gradually burnt until it is enlarged into a cigar-shaped cavity of diameter about equal to the thickness of the seam. It is then necessary to gasify the coal surrounding the second hole 5 yds. along the gallery by igniting this coal and blocking the ends of the first and unblocking the ends of the second so as to allow the air-flow to pass through it. It is also possible by making the holes chevron-shaped instead of straight, to avoid having to ignite the coal in the holes subsequent to the first. A considerable amount of coal is clearly left quite untouched between the gasified regions. The gas must vary considerably in quality during the cycle of gasifying around each hole, and the method involves a good deal of underground work.

(d) *Radial Method for Horizontal Seams.* By this method it is claimed that all the underground work is eliminated. A vertical shaft about 3 ft. in diameter is drilled to a suit-



In the radial method a whole area of a horizontal coal seam can be gasified by means of several shafts from the surface

able point in the seam together with successive rings of similar shafts on circles of radii increasing by 20-40 yds. These shafts are steel-lined and the central one is then connected at the bottom to one of those in the inner circle either by a water-jet method or else by combustion. The latter is achieved by dropping an inner tube coaxially down each of the tubes to be connected, starting a fire at the foot by means of red-hot charcoal, air passing down the central tube and the gas up the outside one. The fire spreads into the coal by the jet action of the air and eventually the two tubes join. The central shaft is then used for air supply and the one on the first circle for the gas off-take, the region between being gasified in the same way as the regions described in the parallel gallery method. When the coal between these two shafts is exhausted the central one is connected to a neighboring one on the inner circle, and in this way the area of the inner circle is uniformly covered, although, as in the previous method, a good deal of the coal is never touched or at least is gasified in the same way. In this way a whole area of the coal seam can be gasified by means of successive shafts from the surface. Each shaft results in the partial gasification of a region of the seam 20-40 yds. long and a few yds. wide, so that the seam must clearly not be very deep if this method is to be economic.

Can the Seam Be a Good Gas Producer?

The conditions for the satisfactory carrying out of the producer gas reactions are essentially as follows:

1. All the oxygen contained in the blast must come into contact with carbon, or with carbon monoxide formed from the carbon, at an early stage of the passage of the gas through the fuel-containing region; and

2. The bulk of the gases must come into close and extensive contact with reactive carbon, before a substantial proportion of the heat liberated by the first reaction is lost.

It is well known that even in a specially designed gas producer sealed in a welded steel case it is difficult to satisfy these conditions completely and continuously, owing to channeling, caking and clinkering. On the face of it, therefore, one would expect it to be still more difficult where the fuel is not fed uniformly into a machine of fixed proportions, but the fire wanders where it will and the surroundings are outside the control of the operator. In particular one would expect a relatively large proportion of unreduced CO₂ owing to poor contact with the fuel which will occur when one side of the channel is not coal at all but goaf, and owing to the fact that the fuel is not broken up but may present a single flat surface of

(Continued on page 52)



Burke Mine Closes

*Data on the Original Nucleus of Hecla Operations
Plus a Resume of Current Activities*

HECCLA MINING COMPANY recently announced the closing of its Burke mine unit, the original Hecla nucleus property, after 40 years of continuous operation, during which period the mine produced 9,050,977 tons of ore, from which the company has received net smelter returns of \$81,333,000 and has paid its stockholders dividends which have totaled \$27,405,000. At the same time the mine has produced and expended the sum of \$53,928,000 in operating expenses, including labor, transportation, milling operations, smelter charges and mining supplies.

The last ton of ore was hoisted out of the mine on July 31. Because of geological conditions which caused a change in the character of the rock formation the Hecla ore body ended on the 3,600-ft. level. Other major producing mines in the same area have had a similar experience, notably the Hercules and Standard-Mammoth properties. The Hecla company did a large amount of diamond drill work on the 3,600 in an effort to locate commercial tonnage at deeper levels, but without success. Extensive crosscuts and drifts on the 3,600 level failed to show additional ore.

About 1,600 ft. of the Hecla shaft and lower workings are being allowed to fill with water. The main shaft has been concreted with a six-in. wall from below the 2,000-ft. level, and the water, when it reaches that height, will be forced out of an opening on the 2,000-ft. level several hundred feet east of the operating shaft.

The Hecla's 2,000-ft. shaft level is the point where a two-mile-long crosscut tunnel takes off easterly to the

Star zinc-lead mine, which the company purchased several years ago in equal partnership with the Bunker Hill company. Subsequent development work has proven the Star mine to be one of the largest and richest zinc-lead deposits in the Western States.

The Star mine was the original unit in a program conceived by the late James F. McCarthy, then president and general manager, to expand the earning power of Hecla to compensate for the dwindling resources of the Hecla mine unit. This policy has been continued under McCarthy's successor, L. E. Hanley, who is now president and general manager.

The next problem confronting the company was the economical production and treatment of Star ore. With this end in view the company again joined Bunker Hill and constructed an electrolytic zinc plant at Kellogg at an original cost of \$3,050,000 under the name of the Sullivan Mining Company. This plant produced the first 99.99+ percent slab zinc in the United States on a commercial scale, the forerunner of all similar brands of zinc on the market today. The plant is under the management of Wallace G. Woolf and employs 350 men, produces 350 tons of slab zinc and 36,000 lbs. of cadmium per month. In addition to its own ores from the Star mine and the Bunker Hill properties, the Sullivan company also treats a large tonnage of custom ores.

Hecla's next mining venture was the purchase of the control of the Polaris Mining Company, adjoining the Sunshine mine on the east. On the development of this property

Hecla spent \$800,000 in underground work and in building a mill before producing a pound of ore and, although the original investment was returned, production of the mine proved disappointing for several years. The company had opened the Polaris vein on the 2,700-ft. level, 1,400 ft. deeper than the Polaris shaft, through the Sunshine workings without finding sufficient ore tonnage. They had also prospected a parallel vein north of the Polaris, known as the Chester vein, with unsatisfactory results. But in August, 1943, L. E. Hanley, manager of both Hecla and Polaris, suggested to Sunshine that they drive a crosscut to the Chester vein from the 2,700-ft. level. This crosscut was driven about 400 ft. and opened the richest and most extensive body of silver-lead ore that has been found in the United States in the past 30 years. During the first six-month period this year the mill feed from this vein has averaged 7.56 percent lead and 40.74 ounces in silver and during that period, according to official report, has produced 2,267,507 ounces of silver, 8,408,077 lbs. of lead and 487,748 lbs. of copper. Net smelter returns for the period mentioned totaled \$2,082,255.32. Mine profits for the quarter ended June 30 are estimated at \$468,472.59. Since finding this ore body Polaris has declared two 10-cent dividends totaling \$400,000.

Hecla company's next venture of importance was the building of a sink-float milling plant at Osburn for the treatment of a zinc-lead tailings deposit in the Coeur d'Alene River estimated to contain over 2,000,000 tons. This plant is now successfully in operation, treating 2,000 tons per day, shipping the sink-float product to the Hecla mill at Gem for concentration.

The Hecla company's other mining interests in the Coeur d'Alene district include the Silver Cable zinc-lead mine east of Mullan, which the company is operating under a straight lease and producing about 80 tons of ore per day, hauling it by truck 17 miles for treatment at the company's Gem mill. Royalty payments from this operation has enabled the Silver Cable company to declare a dividend of \$12,500.

Hecla's other active mining interests are in Colorado, California and British Columbia. In Colorado the company is interested with the Newmont company and United States Smelting in reopening the old Resurrection lead-zinc property near Leadville; in California Hecla has purchased the Blue Moon zinc mine near Hornitos and has built a milling plant which is now in operation, and in British Columbia the company has purchased the Boundary Basin zinc mining property adjoining the Reeves McDonald mine in the zinc belt extending north from Metaline Falls.



Upper left:
Front view of rotary
dump and car
spanker with car
ready to be turned
over

Lower left:
The three paving
breakers, held in
frames and cush-
ioned by heavy
rubber belting are
slowly lowered into
position over mine
car before air is
released to machines
for knocking out wet
coal

Car Spanker

By W. RUFF
Sullivan Machinery Co.

*Paving Breakers Solve Difficult
Car Cleaning Problem at Utah
Fuel Co. Property at Sunnyside*



FACED with the problem of removing wet, packed coal from mine cars at the rotary dump, the Utah Fuel Co. has found the answer in a specially built machine, designed and constructed by the writer, consisting principally of three paving breakers, several sheaves and hoist. The Sunnyside Mine, where this machine has been installed, works to a dip and therefore considerable water is encountered. Because of this, the coal is wet and sticks to the bottom of the cars in the rotary dump. The coal packs so tightly that a pick will not dislodge it. The new device, which has been completely successful in operation, is mounted on a shaft at one side of the rotary dump.

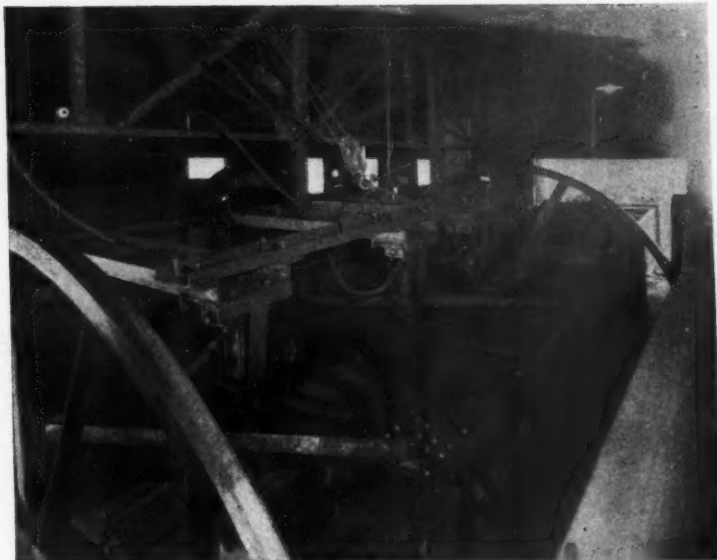
Each breaker was originally equipped with an anvil or tamper welded to the steel. To prevent the welded connection from breaking, which happened frequently if the car was not perfectly horizontal, the anvils were made integral with the rotary dump itself.

This was accomplished by welding a piece of 12-in. channel across the underside of the I-beams on the dump. Three holes were drilled through the channel and a sleeve welded into each hole. The anvils were welded to a piece of 3-in. shafting which was then fitted in the sleeve. A ring welded to the 3-in. shafting keeps the anvils from falling through if the dump is turned over without a car in it. (This new construction was completed after pictures of the installation were taken.)

The breakers are equipped with $1\frac{1}{8}$ or $1\frac{1}{4}$ in. hexagonal breaker steel which when lowered into position, contact the top of the 3-in. shafting. No steels have been broken on this job since Arropoint steels were adopted.

Three supporting arms made of two 3 x 3 angles extend out from this shaft and are joined on the top side by a 12-in. channel iron. 12-in. channels, each 18 in. long, are welded to the bottom side of each arm. Each of the three arms holds a Sullivan K-81 breaker, suitably positioned and equipped with an anvil, or tamper, designed for this work. Rubber belting is used as a cushion for the breaker. The handle of the breaker is suitably wrapped with belting and held snugly by square iron brackets welded into place. The breaker is held up against the rubber cushion by bolted iron clips. Two brackets with rubber lining are placed at the sides to prevent the breaker from swinging out of position.

Controls for operating the Sullivan



Breakers have been lowered into striking position and are ready to knock on car bottom to loosen sticky, wet material

HA-2 hoist which is used to raise and lower the unit are located alongside the push-button controls that operate the rotary dump. The hoist controls consist of a valve set in the air line and $\frac{1}{4}$ in. steel cable which is connected to an extended brake lever. This brake lever is furnished with a weight of sufficient size to apply braking action. By pulling on the cable, the operator relieves pressure on the

brake when frame is being raised. By manipulating the cable, the frame can be lowered into position. The main throttle for admitting air to all three breakers is also located at this control station.

Although the coal often packs itself to a thickness of 20-in., the cars are thoroughly cleaned after the breakers are operated 8 to 10 seconds on each car.

Second-Hand Accident Prevention

WITH cutbacks in production of certain military equipment certain hazards not involved in a plant's peacetime production will be curtailed. The safety equipment used in connection with these operations will then temporarily become surplus stock. Some of this surplus will be new, but most of it will be used equipment. In most cases the used equipment will undoubtedly be put in first-class condition, cleaned, sterilized, and used on peacetime operations where the plant has been shy on safety equipment heretofore—while some will be packaged and retained in the stockroom for future use.

Some used equipment may, however, be thrown on the market. But reputable safety equipment distributors are not likely to buy it, as such establishments do not have a "bargain basement," and they will not want to get the reputation of being a "second-hand dealer" in the health and lives of workers. The used equipment may be bought up by speculators who know

nothing about safety equipment, and care less, and they may sell it "as is," i.e., on a "buyer beware" basis.

A safety engineer who realizes his responsibilities to the workers under his care will not be tempted to buy second-hand equipment, but others in his organization may be (unless properly advised). There is no such thing as second-hand medical supplies, or respirators, or eye protectors. If you are thinking of buying used safety equipment, ask yourself these questions:

1. Will it save my company any money, when I figure the cost of making sure that the used equipment is in condition to perform its safety job and is sanitary?

2. Should I "take a chance" with safety equipment purchased from someone who has no knowledge, nor interest, nor responsibility in safety? Do I have the right to gamble with the health, or perhaps life, of any worker under my jurisdiction?



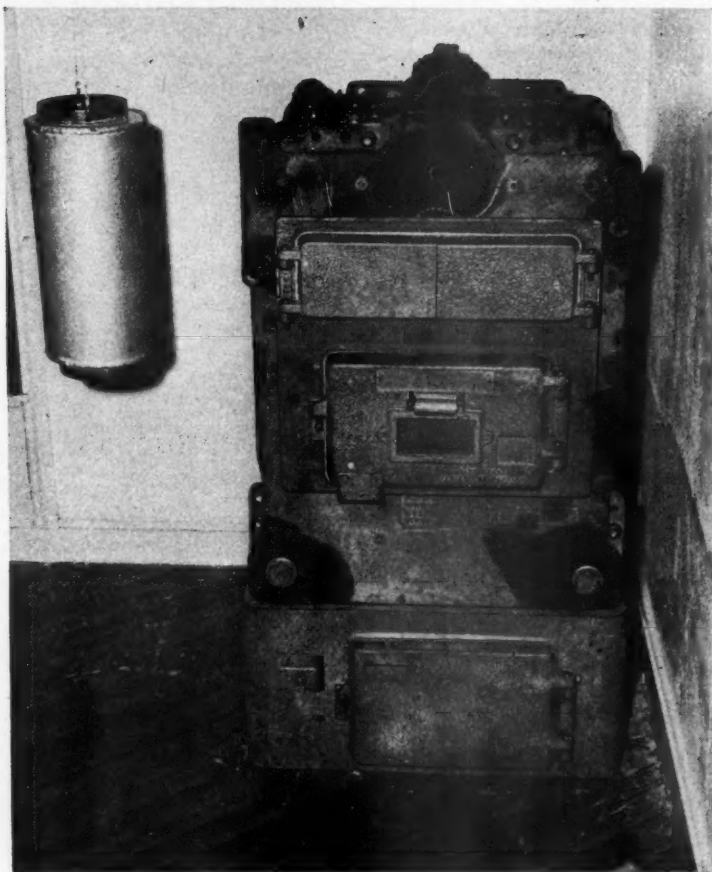
3. If I were the workman, would I have much respect for a safety program that was so niggardly as to require the use of second-hand safety equipment? Would I have much respect for the safety engineer who asked me to wear it? Would I take kindly to wearing it, or would I set it aside whenever I got a chance?

4. If there should be an accident, and a workman was injured because the second-hand equipment failed, or because it wasn't being worn, would my mind be at ease?

Better be safe than sorry—there is no such thing as second-hand accident prevention.

New Anthracite Burner

A Recently Developed Burning Principle Holds Promise of More Efficient and Economical Post-War Heating



The small compact unit on the left will perform functions equivalent to those performed by the much larger present-day burner on the right

A HEATING unit which substitutes a concentrated, fast-burning fire of high intensity for present-day slow-burning methods has been demonstrated by Anthracite Industries, Inc. An automatic heater suitable for the average home will occupy a space less than two by two by three ft. Manufacturers, in the post-war period, will be able to offer a unit that can be sold and installed for considerably less than equipment now in use for any type of domestic fuel.

Anthracite is the most widely used domestic fuel in the New England and Middle Atlantic States. It is currently used to heat five million homes, housing over one-quarter of the people in the United States. No other fuel is so concentrated, with so many heat units per cu. in. This is the principal fact which makes the new development possible.

Burning Rate Increased Five Times

Present home heating equipment burns anthracite at a maximum rate of about 10 lbs. per sq. ft. per hour

while the new method makes it possible to burn 50 to 60 lbs. per sq. ft. per hour. 500,000 B.T.U. per cu. ft. is liberated as compared to about 50,000 by present heaters. This raises the heat absorption per sq. ft. of heating surface from 6,000 B.T.U. to 40,000 or 50,000 and reduces the total amount of coal consumed during the cold season. Although the anthracite thus burns at a faster rate, much less coal is ignited at any one time. Instead of a large body of fuel burning slowly, a very small body burns rapidly. The result is greater heat efficiency and consequently greater heat output per lb. of coal.

The new method is also susceptible to more efficient control—fire can be maintained banked for days at a time during mild weather, with very little consumption and can be brought up much faster in cold weather than is possible with present equipment.

Although the new principle has not yet been incorporated in equipment available to the consumer, a number of manufacturers already are working

on designs for its application in both the home and industrial field.

Mr. Frank W. Earnest, president, Anthracite Industries, Inc., stated, "in addition to the advantages it offers the home owner by combining compactness and automatic operation with the economy of heating by anthracite, this new development promises to have an important effect on the future of the anthracite industry, expanding the market for its product and greatly increasing the number of jobs it will be able to provide after the war."

Equally effective with either hot water, steam or warm air systems, the mechanism for applying the new principle is simple. It consists of a hollow tube six or eight ins. in diameter and approximately 18 ins. long. The anthracite is fed into the tube automatically; the coal burns in the center of the tube, and the ash is discharged at the other end. Water or air, circulated around the hot part of the tube in a small, compact jacket, carries the heat throughout the house in the same manner in which it is

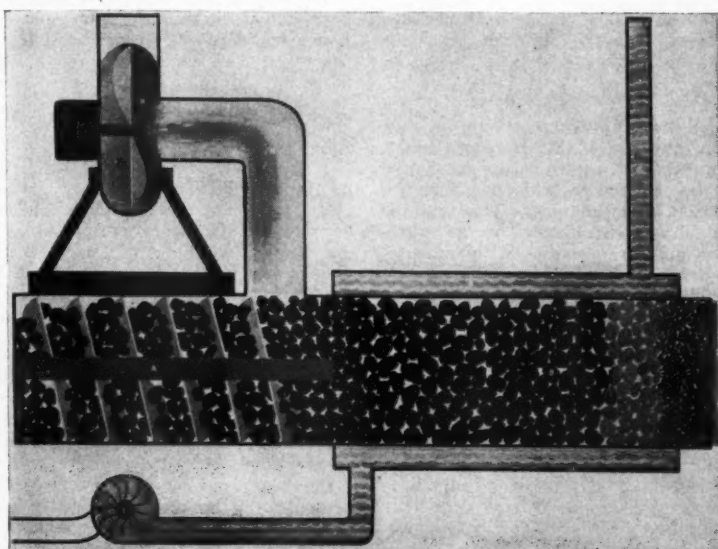
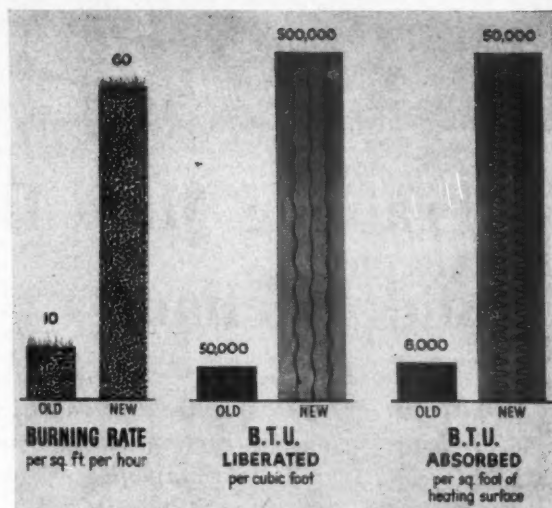
distributed by present day heating systems.

Principle Founded on Combustion Characteristics

"The principle is founded upon a basic characteristic of anthracite combustion which has been confirmed by research in the laboratory," according to Dr. Raymond C. Johnson, vice president in charge of research for Anthracite Industries. "Anthracite, unlike most other fuels, under proper conditions can be made to burn to complete and perfect combustion within its own area without the necessity for secondary air or secondary combustion spaces.

"Heretofore practically all heaters were designed with large grate areas with extensive combustion space above the fire bed so that the large quantities of carbon monoxide which were formed could be burned above the bed

Maximum burning rate is increased from 10 to 60 lbs. per sq. ft. per hr.; 500,000 B.T.U. per cu. ft. is liberated instead of 50,000; the number of B.T.U. absorbed per sq. ft. heating surface is increased from 6,000 to 50,000



Revolving worm introduces coal. Coal burns at center of tube. Ash is discharged at other end. Draft is provided by air entering at ash end and drawn through incoming coal by exhaust fan. Water circulated by small pump

with secondary air. As a result, this equipment contained several times the bulk and weight that is necessary in a furnace especially designed to take advantage of anthracite's particular combustion requirements. The complete absence of complicated flue passes or secondary heat absorbing surfaces in this new method of burning does not lower efficiency, because the heated products of combustion flow through the incoming coal to stimulate ignition and to use the coal as an economizer, replacing conventional secondary heating surfaces.

"The efficiency is further heightened by the fact that the coal cannot clinker. Despite the higher rate of burning, it is not possible for clinkers to form, because the small size of the

fire bed permits the water surrounding the tube to carry off the heat so rapidly that the actual temperature of the burning coal is lower than the point at which clinkers form in an anthracite fire.

"As the development thus represents a principle of combustion rather than of equipment design, the flexibility of application is unlimited. This principle may be employed in the design of equipment for large or small homes, central heating units or space heaters, hand-fired or fully automatic furnaces. Regardless of the forms which the various applications take, however, they will have the universal advantages of extreme simplicity, high efficiency and unprecedented compactness.

"In adaptation to fully automatic equipment, the anthracite is fed into the tube by a conveyor leading directly from the coal supply. The ash is discharged into enclosed, dust-proof containers, which would need to be replaced only two or three times a week, or directly into pits prepared for the purpose outside the basement. The amount of heat desired is regulated automatically by thermostatic control."

Result of Years of Basic Research

Development of the new principle is the result of several years of basic research at the laboratory established at Primos, Pa., by Anthracite Industries, Inc., research and consumer education organization supported by producers of approximately 70 percent of the nation's anthracite. Staffed by the largest group of coal scientists and technicians in the history of the industry, the function of the laboratory is to develop facts and data from which better anthracite-burning equipment and controls can be produced.

The laboratory staff works closely with equipment manufacturers, supplying them with scientific information on combustion characteristics and aiding in the solution of specific design and mechanical problems. During the war, special testing, rating and engineering consultation work has been carried on for the Army, Navy, Bureau of Standards, Federal Housing Administration and War Production Board.





Training Mine Electricians and Mechanics

*A Report By the Committee on Mechanical Loading
Showing Various Instructional Programs in Use By
Coal Companies*

IN COAL mining, the maintenance of equipment is no longer a casual matter but has become one of the major phases of the operating cycle—the machines are more complex in construction than the former models and in a large producing mine there are so many of them. As brought out in a recent series of reports by the Committee, the mechanical and electrical department of a modern mechanized mine is quite an impressive organization and it naturally follows that personnel must be competent mechanics and electricians, educated and trained for the work they have to do.

Coal companies in building up their mechanical departments have never had a reserve pool of specialists to draw from and in the past, the usual procedure was to put an inexperienced man as "helper" on the shop or repair crew and let him learn by observation and absorption. However, even before we came into the war, this method was beginning to break down and vocational instruction made its first entry into coal mining; since then the loss of skilled men and the increased demand for fuel has put such a burden on the maintenance department that these early instructional programs have had to be greatly intensified and accelerated.

Job training is something new in the coal industry and there are no precedents to go by. However, other industries have made considerable progress along this line and some of their ideas have been borrowed but coal companies for the most part have worked out their own plans with the help of various State and Federal agencies. A number of programs are now being used, ranging from technical classes to practical machine shop instruction and apprenticeships. All of these methods have given some good results and the following ac-

counts are submitted by the committee to show how the different plans are working out.

Training School

A program sponsored by a company and the U. S. Office of Education was set up to train mechanics on the job and to train new men for the job as mechanics. The training center was established in an abandoned mine shop which with improvements was divided into two parts: the class room and the laboratory or work shop. The class room had tables and benches for the students while the walls were surrounded by blackboards. In the shop, representative pieces of equipment, such as mining machine, locomotive, controllers, generators, motors, pumps, drills, etc., were placed, upon which the boys actually worked.

The school was divided into three sessions consisting of two four-hour classes and one eight-hour group making a total of sixteen hours a day. Two instructors divided this time equally between them. The four-hour

groups were made up of men who were working, such as mechanics; their session being held in the morning and evening so that those on swinging shifts would have an equal opportunity to attend all sessions. The eight-hour group contained men and boys who at the time were unemployed, hence could attend in the middle of the day. This eight-hour group was made up mainly of inexperienced men, hence the longer hours of training.

The curriculum was set up as follows:

1. A review of simple mathematics as far as solid figures.
2. Fundamental electricity; Theory of magnetism; theory of motors and generators, both A.C. and D.C.; theory of magnetic switches and switch gear. (Note: The mechanical principles and practices of the above equipment were also studied.)
3. Blueprint reading of electrical equipment and circuits. (Principally of machines in service at the mines.)
4. A discussion of machines actually on the floor and how to maintain and repair them.

The class period was divided into two parts: the first was studying theory in the class room, and the second was spent actually working on the various pieces of equipment in the shop. Tools were provided by the



school in a sufficient quantity so that all members of the class were working at the same time. The schedule in the shop was so arranged that by the end of the course each man had torn down and rebuilt each piece of equipment, the instructors adding a touch of realism by creating some trouble in the machine before the man began work on it and seeing that it functioned properly after it had been rebuilt.

The course which was started in May, 1943, ran for fifteen weeks, five days per week making a total of 300 hours for the four-hour groups and a total of 600 hours for the eight-hour group. Attendance was entirely voluntary with the single restriction that 90 percent of the total hours had to be attended in order to receive a certificate of graduation. Approximately 20 men were in each group and about 80 percent of the enrollment finished the course.

Classes in Practical Repair Work

This type of instructional training is comparatively new and was instituted in Ohio under the joint supervision of the Ohio Coal Association and the Ohio U. M. W. A. The Federal Government set aside a sum of money for vocational training for use in labor shortage areas which money is available to the various states through their State Vocational Training Departments, operating through local Boards of Education. Such a school has been established in St. Clairsville, Ohio, to qualify coal miners and others to become mine mechanics; this was, as far as is known, the only one of its kind in existence.

Most of the students had had previous maintenance experience and the course is of the "squad supervision" type with specialist instruction taught by practical coal mine specialists, such as master mechanics, chief electricians, etc. Classes are of two hours' duration and are on three shift basis to accommodate men working at three-shift mines. The method of instruction is actual working on or with equipment and includes (1) electric welding; (2) acetylene cutting; (3) electrical control circuits; (4) D.C. motor repair; (5) machine tool operation, and (6) rebuilding of mobile loading machine.

The following problems however were encountered in the operation of this plan and still persist, although the course is being carried on:

(1) There are a majority of triple-shift mines in this district and the school had to be on a three-shift basis.

(2) Men employed in duckbill equipped mines were not interested in rebuilding a track-mounted loading machine.

(3) No compensation was given trainees and many were already employed at rates almost equalling those paid trained mechanics.

(4) Possible trainees from other industries were not attracted as most other industries pay trainees apprentice wages.

(5) Such a cooperative undertaking is weak, in that individual companies had no assurance their own trainees would return.

(6) Care had to be exercised that the course did not develop into a hobby shop as the majority of trainees were either looking for an easy way to become a mechanic or were not seriously interested. However, the company received four new maintenance men and a rebuilt loading machine from the first program.

Training at the Mine Shop

Instructional training at the mines is necessarily limited by the fact that the U. M. W. A. contract provides no regular apprentice rates to stimulate learning. One company, however drew up a set of rates of its own which provide enough of a differential to encourage self-improvement; new men are placed under expert mechanics and electricians in the central mine shops and the results have been good.

Following the original mechanization of this mine several years ago, excellent results were achieved from requiring section or face foreman to work for a month or two in the machine shop. This enabled the foreman to prepare more accurate reports of needed repairs to aid in preventing machine abuse and to make intelligent checks on lubrication. On the other hand, the same plan, when tried with cutting and loading machine operators did not work out so well and was dropped; the smattering of knowledge they received only led to its misapplication.

The program in effect at the present time has had the best returns, as it places responsibility for education of section foremen and machine operators with the maintenance department. The master mechanic now has a machinery inspector foreman who performs the following duties: (1st) Instructs operators about various parts of their machines from a maintenance standpoint; this instruction is given at the working face. (2nd) Reports to the master mechanic and mine foreman any observed abuse of equipment; abuse here implies improper use, failure to lubricate, etc.

Further, practical instructional methods that have been used and proved effective are:

(1) Meetings held among machine operators, mechanics and management

at which time instruction and demonstration of proper methods of lubrication and operation of the equipment are given. Manuals and detailed prints covering these practices are developed.

(2) Shop foremen's meetings at which "foremanship," proper methods of trouble shooting and how to analyze the condition of a machine are discussed. These meetings show excellent results as it was discovered that mechanic foremen needed to be taught how to instruct their mechanics and how to develop proper diagnosis procedures on machinery.

On-the-Job Apprentices

One company has come to the conclusion that "on-the-job training" is most satisfactory and has recently installed such a program at the new central machine shop where there now is a group of paid apprentices. This training program is designed to meet two primary needs, viz.—to supply machine tool operators to make parts and floor assembly mechanics to assemble or rebuild mining machines.

First, the machine tool apprentices are placed on the night shift by themselves under the direction of an instructor furnished by the Ohio State Vocational Training Department. This instructor, who is a practical all-around machinist, is assisted by one of the company's own experienced machinists familiar with the work. The school is not operated as a normal trade school, but attempts to get the trainees to producing useful products as quickly as possible.

The problem of teaching related subjects such as blueprint reading, etc., is accomplished by having a minimum of classroom work or orientation and then having trainees make parts from working drawings. Simple units are made first, then the more complicated tasks are tried. Apprentices are often assigned to help an experienced man operate the more advanced machine tools. Specialist training lines are being followed in teaching apprentices to operate just one machine tool (such as an engine lathe) until he has reached a certain degree of proficiency.

The second group of apprentices for the rebuilding work presented a more serious problem as it is difficult to train an all-around mechanic qualified to work on all types of equipment. The approach to this problem was first to select qualified mechanics from the various operating mines who were truly specialists on one particular type of cutting or loading machine. An expert mechanic was made leader and was assigned several apprentices; thus the group is trained by their leader to rebuild one particular type of equipment.



Wheels of Government

As Viewed by A. W. Dickinson of the American Mining Congress

THE plans for reconversion legislation developed by "Assistant President" James F. Byrnes and the congressional leaders took form early in the reconvened session of the Congress. Bringing out a well-considered streamlined "human demobilization" measure, Senator George with the leaders of the upper chamber drove the bill through to Senate approval on August 11 by force and by strategy against repeated attacks by the so-called "liberal" element. Legislation for the disposal of surplus war property was developed slowly and carefully in the Senate and in the House, resulting in the passage of the Stewart-Murray-Taft and the Colmer bills, respectively, in these two bodies. Now before the conferees the Senate surplus disposal measure carries the stockpiling section in which the proponents of adequate national defense and producers of strategic metals and minerals are intensely interested.

Demobilization

The George bill as passed by the Senate sets up an over-all Office of War Mobilization and Reconversion, with general powers over the Office of Contract Settlement, the Surplus War Property Administration, and a Retraining and Reemployment Administration with jurisdiction over vocational training and travel allowances for war workers. A joint Senate and House Committee on Post-War Adjustment is created to keep watch over all reconversion activities. State jurisdiction over unemployment compensation is provided for, together with authorization of a Federal revolving fund to insure solvency of state reserves. Unemployment benefits are extended to cover some 3 million workmen in Federal shipyards, arsenals, and other plants.

On August 24 the House Committee on Ways and Means brought forth from prolonged executive sessions a bill which, while it retains the George

Washington Highlights

ADJOURNMENT: Probably September 15 until after election.

DEMobilIZATION: Congress opposes raids on the Treasury.

STOCKPILING: Section 21 of Surplus Disposal Bill hangs in the balance.

GOVERNMENT PIPELINES: Coal producers oppose use for natural gas.

COAL CONTROL: White House sends letter of approval to sponsor.

COAL MISSION: U. S. mining men find British can increase coal output.

MINE "LEASERS": Now considered independent contractors under Social Security tax.

Stockpiling to Conference

Now under consideration of Senate and House conferees are the surplus war property disposal bills approved by the Senate and the House. Outstanding differences between Senate and House versions include the eight-man Surplus War Property Administration set up by the Senate as compared with the single Surplus Property Administrator provided by the House; the Senate's vesting control of the disposal of real property with Department of Interior and Agriculture, as compared with complete authority granted to the Administrator in such transactions by the House; no expiration for the legislation is specified in Senate bill but House limitation is placed at three years after date of enactment; and Senate measure contains Section 21 freezing Government stocks of strategic minerals and metals in stockpiles for the national defense whereas the House bill carries no stockpiling provisions.

As passed by the Senate the stockpiling provision, Section 21, reads as follows:

"SEC. 21. All Government-owned accumulations of strategic minerals and metals, including those owned by any Government corporation, shall be transferred by the owning agency, when determined to be surplus pursuant to this Act, to the account of the Treasury Procurement Division and shall be added to the stockpile authorized by the Act of June 7, 1939 (53 Stat. 811), as amended, and shall be subject to its provisions. The minerals and metals may be transferred in any form in which they are held, but the owning agency or the Treasury Procurement Division is authorized, either before or after such legal transfer, to cause such minerals or metals to be put into forms best suited for storage and use for the common defense. As used in this section the phrase 'strategic minerals and metals'

means all minerals and metals included in either Group A or Group B of the list of strategic and critical materials determined upon by the Army and Navy Munitions Board on March 6, 1944, and any other minerals or metals which said Board determines should be added to Group A or Group B, and shall include ores, concentrates, alloys, scrap, and partially and completely fabricated articles of which the principal components by value consist of such minerals and metals, but shall not include such fabricated articles as the Army and Navy determine are not suitable for their use in the form in which fabricated and which may be disposed of commercially at value substantially in excess of the metal market price of the component minerals and metals of such fabricated articles. Transfers under this section shall be made without reimbursement or transfer of funds except that, if the Reconstruction Finance Corporation or any of its subsidiaries is the owning agency for any property so transferred, the Secretary of the Treasury shall cancel notes of the Reconstruction Finance Corporation in an amount equal to the cost of the property so transferred."

Selection of the final language of this stockpiling section has only developed as the result of months of intensive study and research. The Stewart-Murray-Taft bill was first prepared by the Senate Small Business Subcommittee on Surplus Property Disposal. Thereafter the bill was presented to the Senate Military Affairs Subcommittee on War Contracts which in turn, after conducting hearings, reported the measure to the full Committee on Military Affairs. Hearings were conducted by the Senate Military Affairs Committee, in the course of which attacks were made upon the stockpiling provision but the members of the committee, firm in the belief that these precious stocks of metals and minerals must be preserved for the national defense, have held fast to the language of Section 21 and are now engaged in protecting it in the conference between the two Houses.

The report of the Senate Military Affairs Committee carries the following emphatic approval of the stockpiling section: "Section 21 implements one of the soundest national defense policies conceived by this Government, that of the Stockpiling Act of June 7, 1939 (53 Stat. 811). This legislation, introduced by Senator Thomas of Utah, was reported to the Senate by this committee. It provides in effect that all Government-owned accumulations of surplus and strategic minerals and metals be held as a reserve for the common defense in the event of a future war emergency. . . . The loss of our far-eastern bases, the in-

roads of German submarine warfare during the early part of the war, and shipping shortages which have deprived us of ready access to badly needed minerals and metals demonstrated the wisdom of the Stock Piling Act of June 7, 1939. Those same considerations, in the judgment of the armed services and of this committee, justify the addition to the stockpile contemplated by this Act."

Senator James E. Murray of Montana, in speaking of the inclusion of Section 21, said: "The Hayden clause, which places primary and secondary strategic metals and minerals in a national stockpile for use of the military forces for the common defense, insures an adequate supply of these important basic materials in event of a future emergency. I have been glad to support vigorously Senator Hayden's proposal, since I have been interested in stockpiling for a long time and have collaborated with other Western Senators on various bills heretofore proposed. One of these was the Scrugham bill."

Speaking of the stockpiling clause, Senator James G. Scrugham of Nevada, expressed his opinion thus: "As one of the original proponents of strategic and critical minerals and metals stockpiling, I am gratified that the Senate has passed so reasonable a proposal. Senator Stewart's subcommittee on Surplus Property must be given a great deal of credit for a farsighted effort to strengthen the national defense."

Senator Carl Hayden of Arizona, gave his views in an interview as follows: "Important as the Surplus Property bill is, as a whole, in its potential effect on the national economy, the stockpile clause, as it affects the more distant future of our country, as well as the immediate post-war economic phase, is in my judgment one of the most important pieces of legislation to pass the Senate since I have had the honor to sit in that body. I can only hope that the House of Representatives will see eye to eye with us in this matter and preserve section 21 intact."

Government Oil Pipelines

While the Colmer Surplus Property bill approved by the House followed closely the recommendations of Surplus Property Administrator William L. Clayton, it did contain a provision requiring the Administrator to submit full reports on synthetic rubber and aluminum plants with suggested plans for their disposition or use before proceeding with sales. Deeply concerned lest the large Government-owned petroleum pipelines might be purchased by private interests and used for the transportation of natural gas from the mid-continent fields to the East-

ern seaboard, members of the House interested in the anthracite and bituminous coal industries, led by Representative Walter (Dem., Pa.), succeeded in amending Section 13 of the Colmer bill to read in part that "no Government agency shall dispose of any surplus Government-owned plants for the production of synthetic rubber, or aluminum, or any pipeline for the transportation of oil, which cost the Government \$5,000,000 or more, except in accordance with this section or pursuant to an option therefor."

A provision in the bill passed by the Senate also requires reports to the Congress on such plants and pipelines previous to disposal as surplus property, and thus it is hoped that a breathing spell will be provided during which industry and the districts and communities which would inevitably be affected can act through their congressional delegations for their own protection.

Federal Coal Control

In addition to the publication of the Maloney "Interim Report on Oil and Coal" discussed last month and the inclusion of a call for reenactment of a national bituminous coal control act in the Chicago convention platform, the President in Mid-August added his endorsement in a letter addressed to Representative John W. Flannagan, Jr. (Dem., Va.), and made public by the Congressman on the floor of the House. Flannagan, who has introduced a bill which would reenact the Guffey Coal Control Law which expired in August, 1943, placed the letter in the *Congressional Record*.

Referring to his active sponsorship of coal control legislation in 1935, and 1937 the President in his letter discusses variant views as to whether a coal control law should be administered by an executive department of the Government or by an independent commission and states that experience has demonstrated "that better results have been and will be accomplished under a single head within one of the executive departments."

"Leasers" Considered Contractors

The status of "leasers," an issue particularly important in the metal mines of the Rocky Mountain west, within the meaning of Titles VIII and IX of the Social Security Act has been determined under the August 11 ruling of the Commissioner of Internal Revenue. The announcement states that "leasers" engaged in working portions of a mine owned by a mining company are considered to be independent contractors and not employees within the meaning of the Act. Collector's Mimeograph No. 5728 car-

(Continued on page 52)

PERSONALS

George W. Potter, has resigned his position as executive vice president and general manager of the Eagle Picher Mining & Smelting Co., effective September 1. Joel M. Bowlby, of Cincinnati, president of the company will assume the duties of general manager. He will be assisted by vice presidents D. C. MacKallor, Hamilton A. Gray, and Elmer Isern.

G. C. Niday, manager of Tri-State Mines and Mills, has also resigned from Eagle Picher, effective September 1.

Dr. George R. Spindler, head of the West Virginia University School of Mines, has gone to England to con-



duct classes in underground mining for the British Ministry of Fuel and Power.

Bituminous Coal Research, Inc., has announced the appointment of Elmer R. Kaiser, as assistant director of research for the bituminous coal industry's expanded technical program. He will be located in the new Pittsburgh office of Bituminous Coal Research, Inc., 719 Oliver Building, Pittsburgh 22, Pa., where Dr. H. J. Rose, the recently appointed director of research, has already established headquarters.

B. N. Sharp, formerly manager of the Richmond mine at Salt Lake, Mont., is now general manager of mining development on the Snowshoe group of claims at Libby, Mont., for the Standard Silver-Lead Co. of Spokane.

W. S. Murphy, chief of the Gold and Silver Section of Miscellaneous Minerals Division, WPB, has resigned in order to return to private business, WPB announced July 21. This section is being merged with the Rare

Metals and Mercury Section with Henry E. Stauss, as the new chief.

Frank P. Kerr was recently appointed general manager of the Eastern Coal Corporation. He succeeds L. C. Skeen, deceased. Mr. Kerr was previously affiliated with the National Mining Co., Pittsburgh & West Virginia Coal Co., Excelsior Pocahontas Coal Co. and the Koppers Co. He has also been inspector at large for the West Virginia Department of Mines.

S. L. (Tony) Leichtle, formerly engineer in the St. Louis district for the Old Ben Coal Corp., as well as assistant district manager for that company, has been promoted to the grade of Captain in the Quartermaster Corps.

Clarence V. Burns, assistant treasurer of the American Zinc, Lead and Smelting Co., was recently elected secretary-treasurer of the St. Louis Control of the Controllers Institute of America.

Carl Holmes, of Phoenix, Ariz., prominent agriculturist, has been elected to the board of directors of the Phelps Dodge Corporation.

John C. Cosgrove, consulting engineer and business man of Johnstown, Pennsylvania, has been elected a director of the Pennsylvania Research Corporation.

Frank F. Russell, was recently elected president of Cerro de Pasco Copper Corporation and of Cerro de Pasco Railway Co., effective September 1, to succeed Harold Kingsmill resigned. Mr. Kingsmill will continue as a director and will act in a consulting capacity for the corporation.

Dr. Frank F. Grout, professor of geology and mineralogy at the University of Minnesota, has been appointed director of the Minnesota State Geological Survey, upon retirement of Dr. William H. Emmons. Dr. George A. Thiel, professor of geology and mineralogy, has been appointed chairman of the department of geology and mineralogy. Both appointments became effective July 1.

Sanford W. Ladic, assistant superintendent of mines for the Baguio Gold Mining Corporation, until the

Japanese invasion, is reported to be interned with his family at a camp at Baguio, Mountain Province, Philippine Islands.

William Balderston, formerly vice president in charge of the commercial division of the Philco Corporation has been elected vice president in charge of operations and a member of the executive committee according to John Ballantyne, president.

Alex Grant has accepted the position of general manager of the Boulder Valley Coal Co., now operating two mines in northern Colorado and one in Routt County. Mr. Grant has been with the Rocky Mountain Fuel Co. of Denver, Colo., for the past five years. He was for 10 years assistant superintendent at Federal No. 1 mine of the Koppers Coal Division, Grant Town, W. Va., and served two years as manager at the Maiden mine of Kelley's Creek Colliery Co., Morgantown, W. Va.

Earl Belding, formerly mine foreman at the Lava Cap gold mine at Grass Valley, Calif., has been named mine superintendent for the Keystone copper mine, Copperopolis, Calif., operated by the Lava Cap Gold Mining Corporation.

Lt. Frank Irwin, of The Tamping Bag Co., Mount Vernon, Ill., recently reported missing in action, is now officially reported a German prisoner of war. Lt. John K. (Jack) Childs, who prior to entering the air force



Lt. John K. Childs

was a salesman for The Tamping Bag Co., was reported missing June 10. His group of Mustang fighters is reported to have accounted for 102 German planes in 19 days.

Frank P. Kerr, general manager of the Eastern Coal Corporation, has announced several new appointments at the company's mines: E. F. Milem has been made superintendent at No. 1 and No. 11 mines with C. B. Morrison appointed foreman. William Ford is superintendent at No. 3 and No. 8 mines with Harold Brogan as foreman. B. C. Riddle has been made superintendent at the company's No. 7 mine, and Tony Fanto has been appointed foreman.

Russell C. Fleming, for the past two years mining engineer with the National Department of Mines and FEA in Brazil, has resigned to take charge of raw materials for the Companhia Siderurgica Nacional steel plant at Volta Redonda, State of Rio de Janeiro, Brazil.

Dean James Fisher, of the Department of Mathematics and Physics at the Michigan College of Mining and Technology, retired July 1 after 50 years of service at the school. **Professor John M. Harrington** is the new head of the Mathematics Department and **Professor F. L. Partlo** is the new head of the Physics Department. Dr. Fisher joined the faculty of Michigan Tech in 1893. At the request of the Board of Control, he will serve during the coming year as director of the newly established Extension Division.

Richard Maize, who has held the title of Acting Secretary of Mines of Pennsylvania since January, 1943, was recently appointed to the full Secretaryship by Governor Martin.

Frank W. Bemis has been appointed Sales Manager of the American Cable and Hazard Wire Rope Divisions of American Chain & Cable Company, Inc., with headquarters at 230 Park Avenue, New York.

Robert E. Heineman, mineralogist at the Arizona Bureau of Mines, has resigned to become an active partner in the firm of Durand and Company in Tucson.

W. D. Bryson is now manager of operations for the Hayden Coal Co., at Haybro and Grassy Creek, Colo. Mr. Bryson was formerly manager of mines for Utah Fuel Co., with operations in Colorado and Utah.

A. B. Johnson, who has been plant superintendent and master mechanic for the Cleveland Pneumatic Tool Co. for twenty-eight years, has been named plant manager and will now have complete responsibility for all manufacturing facilities.

John R. Van Fleet, formerly vice president and general manager of the Vanadium Corporation, was recently made president. He is also president of the Union Mines Development Corporation, a unit of Union Carbide & Carbon Corporation.

John W. White has been elected President and General Manager of the Westinghouse Electric International Company, subsidiary of the Westinghouse Electric and Manufacturing Company. **William E. Knox**, formerly assistant general manager, has been elected Vice President.

George W. Land, who has been engaged in research work on coal at Battelle Memorial Institute, Columbus, Ohio, has become research and combustion engineer for the West Kentucky Coal Co., at Earlington, Ky.

H. H. Fuller has been elected vice president in charge of West Coast steel activities of Bethlehem Steel Co., effective July 1, as announced by **E. G. Grace**, president of the company.

Mr. Fuller succeeds **W. H. Stewart**, who has held the office for the past 12 years. Mr. Stewart, though retiring from active duty, will continue in an advisory and consulting capacity.

Arthur H. Kent, has announced his partnership with **Valentine Brookes**, former deputy attorney general of California, and former special assistant to the attorney general of the United States. The firm will be known as Kent and Brookes.

Robert M. Leng, C.P.A., on August 1, became a member of Loomis, Suffern & Fernald, certified public accountants of 80 Broad St., N. Y.

Walter P. Hallstein, Jr., has been appointed assistant manager of the Goodyear Tire & Rubber Co., Belt Sales department, according to **W. C. Winings**, manager of Goodyear's Mechanical Goods Division.

— Obituaries —

J. G. Clark, 73, one of the West's best known mining men, died July 25, at Boulder, Colorado. He was a pioneer in the tungsten industry and



graduated from Michigan Tech in 1902 and later became superintendent of the Loretto Iron Co. He returned to his alma mater in 1927 to the position held at the time of his death. He became widely known as senior author of a standard text on mine examination and valuation.

John M. Ross, 70, pioneer lawyer of Arizona and attorney for the Phelps Dodge Corporation, died August 1, at Laguna Beach, Calif. He was considered an authority on legal problems involving the Colorado River.

James P. Keatley, representative of the Mine Safety Appliances Company, died August 4 at St. Clairsville, Ohio. A veteran of the A. E. F., from which



he returned a commissioned officer, Mr. Keatley engaged in engineering work successively with Stonega Coke and Coal Co., the West Virginia State Department of Mines and since 1929, with Mine Safety Appliances Co.

Grant H. Smith, 79, well known mining attorney of California and Nevada, died recently in Berkeley Calif. The School of Mines at Reno published his "History of the Comstock Lode" in 1943.

Dick A. Mitchell, 68, chief engineer of the State Division of Lands and Minerals in Minnesota, died July 25, at Virginia, Minn. Mr. Mitchell has been identified with this department since 1913.

Raymond E. Ober, 66, mining engineer of Duluth, Minn., died August 4, at Duluth. He attended the Minnesota School of Mines and figured prominently as a consultant in the early development of the Cuyuna iron range.

Prof. Charles H. Baxter, 65, head of the department of Mining and Civil Engineering at the Michigan College of Mining & Technology, died July 29, at Houghton. Mr. Baxter

he returned a commissioned officer, Mr. Keatley engaged in engineering work successively with Stonega Coke and Coal Co., the West Virginia State Department of Mines and since 1929, with Mine Safety Appliances Co.

W. H. Cullers, 65, president of Sumpter Valley Dredging Co., died recently at Portland Ore. He was a major figure in shipbuilding before and during World War I, as manager of Northwest Steel Co. He later organized a successful gold dredging operation in Sumpter Valley.

Clayton Silver Mines

(Continued from page 23)

drops into the bin. The bin is high enough for the trucks to drive under and take load.

The tailing from the lead circuit receives the copper sulphate from a small dry feeder and is pumped by a 2-in. Gould sand pump to a 4-foot conditioner tank set close to the zinc roughers. A small amount of Xanthate, Z-3, and crecyllic acid is fed into the conditioner tank. The overflow from the conditioner flows directly to the zinc rougher, a 3-cell Fagergren machine. The zinc rougher froth is cleaned in a single-cell Fagergren. The froth from the zinc cleaner is pumped to a 10-ft. thickener and the tailing from the cleaner returns to the zinc feed pump. The zinc thickener is set so that the thickened zinc concentrate flows by gravity to the same kind of filter that is used for the lead, and is set over the zinc concentrate bin. From one end of the mill to the other the distance is only 50 ft. and from the ball mill floor to the filters the vertical distance is only 15 ft. The entire operation can be viewed from either of two vantage points so that only one man is needed in the mill on each shift.

Disposal of Concentrates

The concentrates are hauled 60 miles to the railroad at Mackay in six-ton loads, and from there shipped in gondolas in bulk. About half of the truck haul is on paved road and the rest is on poorly improved mountain road which crosses two summits at about 7,500 ft.

At the present time the ore is the best it has been: 6 ounces of silver; 4.8 percent lead, and 2.2 percent zinc. The lead concentrate averages 75 ounces silver and 67 percent lead. The zinc concentrate, 6 ounces silver and 48 percent zinc.

Mill recovery: Lead, 90 to 95 percent; silver, 95 percent; zinc, 85 percent; a few percentage points in recovery are sacrificed to increase the tonnage put through the mill, as this is always kept at maximum capacity.

Some Practical Conclusions

The operations at Clayton have permitted us to draw a number of conclusions which may also interest other small mine operators: We find inexperienced local labor, trained at the mine and mill, best at a small operation. It is also essential in this sort of an operation to keep the mill running full time at maximum capacity as recurrent shutdowns for simple repairs are extremely costly. During 1942 the mill ran all but 89 hours. In 1943 much more time was lost due to manpower shortage in the mine. If there wasn't sufficient tonnage to run

REAGENTS USED

	Lbs. per ton
Soda ash	0.5 into ball mill.
Cyanide	0.1 into ball mill.
Zinc sulphate..	0.5 into ball mill.
Xanthate Z-3...	0.2 most into ball mill.
Crecylic acid...	0.1 half into ball mill.
Copper sulphate	0.4 into tailing from lead circuit.
Grinding balls..	2.0
H.P. per ton or ore milled.....	1.75
H.P. per ton or ore crushed....	0.5

at maximum capacity the mill was shut down. This year, however, in spite of the shortage, the mill is running on the 1942 schedule due to the fact that mechanical tramming has greatly increased mine production per man. Costs have risen a great deal during our operation of the property: from \$1.80 in 1936 to \$4 in 1943.

The most important thing in a small operation is a surplus of power.

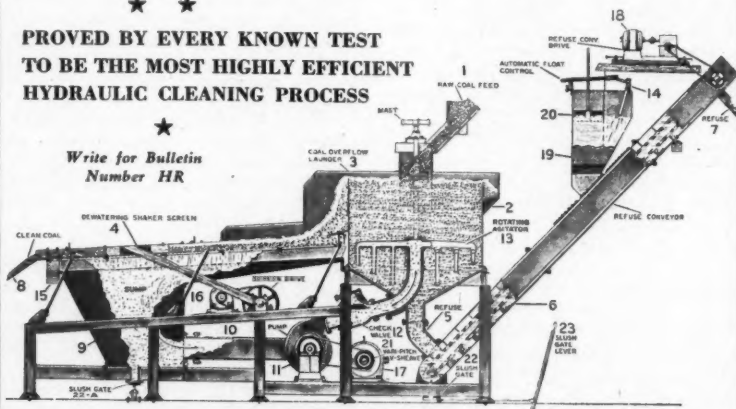
In such operations, slow speed machines are best as they will run longer without attention and with less repair. The simpler the operation the more continuous it is. Simplicity should not be sacrificed for the ultimate in mill recovery. In small electric power systems heavy on and off loads required by compressors and hoists should be avoided wherever possible. Electric hoists are hard to eliminate as they have many advantages over other kinds but electric driven compressors can be avoided. If all or part of the electric power is generated by diesel it is much better to drive the compressor directly this way.

We have also learned the following from our operations here: Never over-produce or try to over-produce from a small mine. When actual reserves or probable reserves of ore are on the increase there is always the temptation to increase the mill capacity with the result in many cases that the mine cannot keep up to mill capacity. It is much better in a small operation to have 150 tons of ore for a 100-ton mill than to have 100 tons for a 150-ton mill.

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REPORT OF THE COAL MISSION TO BRITAIN

A summary of the report of the mission, which has been presented to the Combined Coal Committee of the Combined Production and Resources Board and the Combined Raw Materials Board

AMERICAN coal mining machinery, sent to Britain, is making a major contribution to speeding defeat of the enemy, the coal mission that recently visited the United Kingdom reported recently. The mission, comprised of coal mining technicians and economists from government and industry, was headed by A. S. Knoizen, director of the Mining Division, War Production Board. The mission's report is now being studied in Washington and London.

The mission reported that the British officials are doing an outstanding job in the control and distribution of all solid fuels. Every pound of coal is controlled from the mines to its ultimate burning point. Careful control is exercised over fuels for domestic use and the supply kept down to the barest minimum necessary for the people of Britain.

The mission found that the British are making excellent use of American "strip mining" machinery for increasing coal production to ease Allied fuel shortages. To hasten victory by increasing British Coal production, the United States is sending equipment both for developing new "strip" or "open-cast" mines and for mechanizing the old "deep" mines. The mission made a careful survey of the use of this equipment, and of other aspects of the British coal situation.

The mission expects that the British will be able to raise the rate of production of "strip" coal from the current 10,000,000 tons a year to 18,000,000 or 20,000,000 tons with the aid of American equipment. This expectation assumes that all American "stripping" equipment now allocated or recommended for allocation will be received and will be put into operation. It was the view in Britain, however, that production at the rate of 15,000,000 tons a year is the most that can be expected in the coming coal year. The total amount of coal that the mission thinks can be mined by this method is from 80,000,000 to 100,000,000 tons.

Because of the shortage of trained men required to install and operate it, a considerable amount of American underground mining machinery has not yet been put into use. The mission recommended, therefore, that future shipments be held up until the British can get the machinery now on hand in operation.

Full operation of all "deep mine" equipment provided for under the 1944 program, plus a similar program proposed for 1945, should help Britain to increase its underground coal production by approximately 12,000,000 tons per year. Upon completion of the mine training program, expected within the next five or six months, the mission has no doubt that the British mines will be able to put all American coal mining equipment provided for by the program effectively to work.

underground conditions of British mines are different and there are many physical problems that must be solved before American type equipment can be employed on a large scale.

The British Government is making excellent progress in training personnel, and the Sheffield School for mechanics and electricians will begin turning out trained men within 60 to 90 days. A mission recommendation that additional demonstrators and installation engineers be trained was adopted immediately. Furthermore, on recommendation of the mission, the British Government is sending from 70 to 100 mine managers to the United States to gain experience in the use of American mining equipment under conditions similar to those at home. Some of the men already have arrived at the American mines.

The mission found a very complex



The group studying British underground coal mining problems assembled at the Sheffield School, Sheffield, England

Of the 190,000,000 tons current total annual underground production in the British Isles, about 40,000,000 tons could, in the mission's view, be mechanized immediately with American type equipment. The resultant gain in efficiency and economy of manpower can be a major contribution to the war effort, the mission feels. A large part of the remaining 150,000,000 tons "deep mine" production can be mechanized gradually after major changes have been made in transportation, preparation, and methods of dealing with the difficulties of converting from complete long-wall operations to complete room-and-pillar systems of mining.

It must be realized, the mission pointed out, that American equipment will not operate as well in British mines as in American mines. The

labor situation, of long standing, in the British mines. However, there was found no antagonism on the part of labor to the installation of American mining machinery or to changing the mining system. Labor seems to realize fully that mechanization is the only way to achieve additional coal production during the present critical shortage, and that cheap coal is necessary to maintain the commercial position of the British coal industry after the war.

The mission has expressed its deep appreciation of the fine cooperation extended to them during their visit in Great Britain and of the unlimited efforts of the British officials concerned to make it possible for the mission to obtain all desired information without any restriction. The cooperation of all those concerned with the

Coal Mission in the United Kingdom demonstrates the value of combined efforts in the solution of common problems. The planning undertaken by the Combined Production and Resources Board to stimulate the production of coal will be of undoubted benefit in alleviating the world coal shortage.

The complete personnel of the coal mission is as follows:

A. S. Knoizen, chairman of the mission, director of the Mining Division, War Production Board, vice president of the Joy Manufacturing Co., is an outstanding authority on coal mining machinery and equipment.

Paul Weir, former vice president of operations of the Bell and Zoller Coal Mining Co., Chicago, Ill., and for the last several years consulting engi-

neer and also publisher of "Mechanization."

C. H. Hayden, vice president of operations of the Sahara Coal Company, of Chicago, Ill., is in charge of their underground and strip operations and has had wide experience in underground mining of coal and metals.

T. G. Gerow, vice president of operations of the Truax-Traer Coal Company, Chicago, Ill., and well known authority on strip mining and the use of both large and small stripping equipment.

R. H. Swallow, chief engineer of the Ayrshire Patoka Coal Collieries Corporation, Indianapolis, Ind., is a mining engineer with years of experience in strip mining and the operation of both large and small equipment in thick and thin coal in the central states area.

R. G. Lazzell, production engineer of the Island Creek Coal Company, has had many years experience in the installation and use of modern machinery in underground mines of both thick and thin seams.

Capt. H. O. Rogers, coal economist, Combined Coal Committee, formerly with the Economic Division of the Bureau of Mines.

W. F. Hahman, chief of the Bituminous and Distribution Division of the Solid Fuels Administration for War, was formerly an assistant to the chief of the Marketing Branch of the Petroleum Coal Division.

G. A. Lamb served as chief of the Economics and Statistics Division of the Solid Fuels Administration for War and is now the assistant director of the Bureau of Mines.

Wheels of Government

(Continued from page 47)

ries the ruling, which is based on a decision of the U. S. Circuit Court of Appeals for the Ninth Circuit, August 7, 1942, in the case of Anglin v. Empire Star Mines Company, Ltd.

U. S. Coal Mission—Britain

The U. S. Coal Mission headed by A. S. Knoizen, Director, Mining Division of WPB, which recently spent several weeks in British mines, has reported that current British strip coal production can be increased from 10,000,000 tons to 18,000,000 or 20,000,000 tons per year when all equipment now allocated or recommended for allocation is put into use. Total anticipated recovery by stripping is estimated at between 80,000,000 and 100,000,000 tons.

The Mission also reports that through operation of American equipment provided for in the 1944-1945 program, underground production should be increased approximately 12,000,000 tons per year. While the problem is complicated by traditional practices which have developed over

many years the Mission felt that there was no antagonism from the workmen toward American mining equipment or to necessary changes in mining methods, although mechanization will necessarily be a matter of gradual accomplishment.

Post-War Operations

(Continued from page 27)

man trip cars run at legal speeds in excess of those now permitted.

Prompt and Proper Action Mean Prosperity

As to the future generally, I believe we're safe in saying that coal will continue to be, as it has been in the past, the chief fuel of industry. It can be a great deal more than that, however, and being that great deal more will spell the difference between poor mines and prosperity. With price and quality, for which we as production men are responsible, coal can step out and become the quality fuel for homes and remain the chief basic material for the chemical, plastic and metallurgical industries. We in coal must be as smart and resourceful as our competitors in petroleum and natural gas, using the best available managerial, technical, research and sales talents to get the best possible product at lowest cost, thus creating markets and keeping them sold. Rather than wishful thinking, we'll need plenty of constructive thinking and planning with the talent, capital, and drive to back it up. Given these things, our future as an industry, while by no means trouble-free, should be vigorous and prosperous.

Underground Gasification

(Continued from page 38)

relatively low area per unit volume. The conditions that the primary reaction heat must not be dissipated by heat losses will probably be fairly well satisfied because the surrounding earth and rocks will be reasonable insulators once their moisture has been driven off.

Method Not Too Efficient

Regarded as a gas producer therefore the method is not very efficient both because the cold gas efficiency and the calorific value are low unless oxygen enrichment is used and also because of the very large amount of coal which must be left underground partly coked and mixed with mineral matter.

Most British coals are worth more per therm in the form of clean sized coal than they would be converted at low efficiency into cold producer gas of 150 B.Th.U. per ft.³ obtainable at the pit head. Contrary to what might appear at first sight, coal is a much more flexible form of energy than gas of low calorific value and moreover can yield all kinds of valuable materials which are unlikely to reach the surface without being destroyed or condensed on the way if the coal were gasified below ground. Hence, in spite of the attractiveness of avoiding underground labor and increasing the output per man, the practice of underground gasification in Britain appears to offer little prospect of proving economical.

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From October 8th to 14th, the nation will observe fire prevention week.

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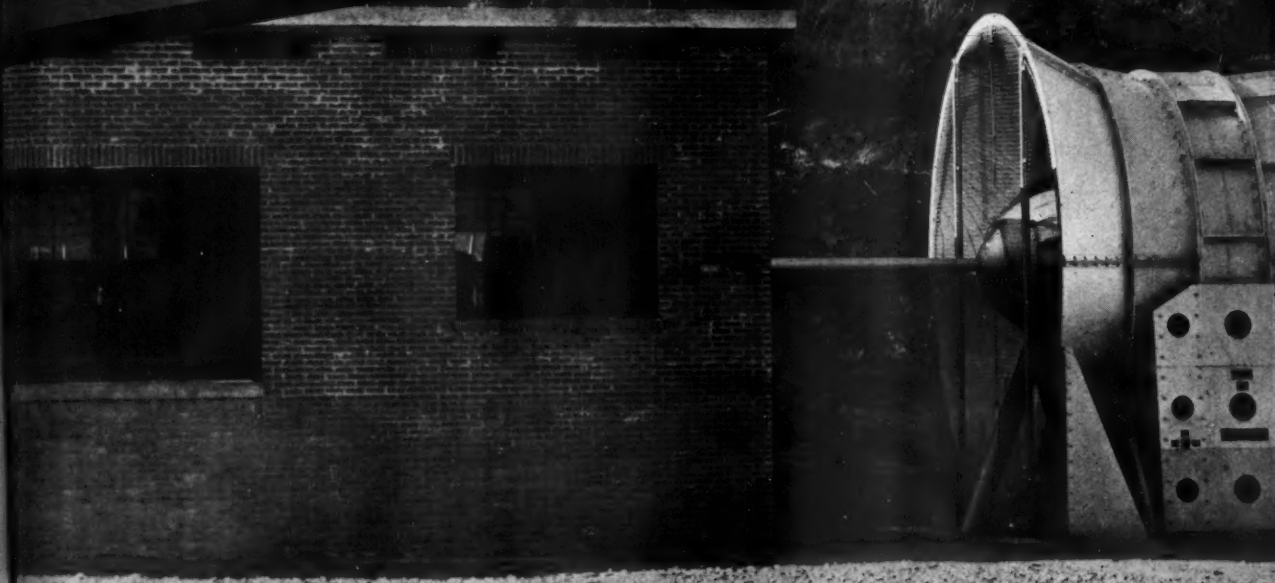


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News and Views

Eastern



States

WEST VIRGINIA

»»» Ceiling prices on bituminous coal produced in Northern West Virginia and shipped by truck from mines or preparation plants were revised upward recently by the Office of Price Administration.

The new schedule, effective July 12, will result in an overall increase in producer prices of less than three cents per ton, which will be passed on to the consumer level by dealers whose ceilings are determined by formula.

Approximately 500,000 tons of coal annually are affected by the new order, most of the district's production of 40,000,000 tons annually being delivered by rail.

»»» The thirty-seventh annual meeting of the West Virginia Coal Mining Institute will be held in Charleston at the Daniel Boone Hotel on Friday, November 24. The technical sessions of the meeting will consider problems relating to safety, modernization and personnel for the coal industry. Luncheon and dinner meetings are planned among the interesting events to take place.

»»» In analyzing the activities of workmen in forty-three mines of the Kanawha District for the year 1943, a number of unusual conditions are noted.

In 1942 wages were stable, days per week were held constant at five, or if the sixth day was worked it was manned by employees whose work was staggered to make the extra day possible. This uniform plan continued for a month and a half into 1943, at

which time the sixth day became permissible with time and one-half pay.

November directives awarded pay increase and increased the contract hours to the Wage and Hour Ceiling of 40 hours for the inside workers, while retaining the contract (U.M. W.) hours of 35 per week for the outside employees. It also tied the 40 hour ceiling to contract or piece workers by an averaging formula, and threw in an extra earning as "portal to portal" wages for all inside workers.

So, a confusing picture is presented on 1943 workers' statistics. All of the 1943 workers in this survey were on a normal basis for the first forty-five days. Then the sixth permissive day element was injected but was not accepted at numerous mines, with a result that many mines were working five days a week and others six days. The objection to the sixth day was

gradually overcome, however, by means of the time and one-half feature of pay, so that, when the November directives were issued most employees were willing to accept the sixth day terms.

With all of these elements considered, the analysis shows:

Forty-three mines in 1943 produced 0.2 percent less tonnage than 42 mines did in 1942, while showing an increase of 1.4 percent in average days worked, with a 9.8 percent increase in possible full time. The average number of men employed in 1943 at the 43 mines was 13 percent less than in 1942, due chiefly to armed force extractions. The average yearly tonnage per man was increased 14.7 percent by the extra work day. The average daily tonnage per man increased from 5.2 to 6.1 tons by reason of the 8 hour day, but the productive labor decreased 6.8 percent. During this unusual period, however, the average annual earnings per man increased 26.4 percent.

These data are well supported by the West Virginia Coal Association in a statement prepared from records of the Workman's Compensation Commission embracing all mines in the state. Its figures show a 29.7 percent increase in the annual wage.

PETER F. LOFTUS

Consulting Engineer

ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

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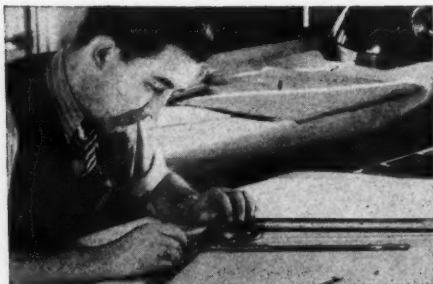
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» » » The Royal Block Coal Co., is a new operation at Morrisvale on Little Coal River under the management of Clay Pauley. This mine was formerly operated under the same name, as a subsidiary of the New York Coal Co., but was closed and has been idle for a number of years. Cars are being loaded from trucks at present, pending installation of side track facilities.

PENNSYLVANIA

» » » William B. Wardrop, state inspector of the 30th Bituminous District for 23 of the 63 years he had been associated with mine work before his recent retirement, was honored by more than 300 national, state and local coal leaders at a testimonial dinner recently at the Indiana Methodist Church.

Speakers cited especially his constant efforts to encourage young men to follow their ambitions. At the time he was named an inspector in 1921, Mr. Wardrop was superintendent of the Iselin operations of the Rochester & Pittsburgh Coal Company.

Richard Maize, secretary of the Pennsylvania Department of Mines, said that because of the work of Mr. Wardrop, "many men are living and well today who would be dead or crippled."

H. D. McGinnis of the DuPont Powder Company, Morgantown, West Virginia was toastmaster. A watch was presented to the honor guest in behalf of his friends by Thomas S. Lowther, Indiana, retired inspector.

» » » The Jones & Laughlin Steel Corporation recently started construction on a new seven and one-half million dollar battery of 106 by-product coke ovens.

It is expected the new ovens will increase the Alliquippa Works' output of metallurgical coke about 50,000 tons per month, representing a 50 percent increase. Engineers hope to complete the project in 14 months.

» » » The new Mingo mine of the Pittsburgh Coal Company near New Eagle, will be renamed as a memorial to Sgt. Archie Mathies, a former employee of the company and winner of the Congressional Medal of Honor, who was killed in action last February 20.

Pittsburgh Coal has decided to change the name Mingo to Mathies Mine in honor of the heroic action of young Mathies in attempting to land a crippled Flying Fortress at an English airdrome in an effort to save the life of the injured pilot.

Mr. and Mrs. William Mathies of Finleyville, parents of the hero, have been formally notified of this action by President J. B. Morrow of the company.

Sgt. Mathies, who had been employed at Champion 3 Preparation Plant of Montour 10 mine near Liberty, was on his sixth mission in the European theater of war when he lost his life. He was the first resident of Finleyville to volunteer for the Army after World War II started.

The company plans to place a plaque with a copy of his citation at the portal of the mine, which is visible from the highway.

» » » Fifty-two men passed state mine examinations given at Johnstown High School in June, and 49 were successful in similar tests conducted at Windber, according to lists announced by Spurgeon S. Johns of Westmont and M. W. Thomas of Windber, inspectors.

In the Johnstown group are three mine workers who qualified as first-grade mine foremen; six, as second-grade foremen; 12 as first-grade assistant foremen; eight, as second-grade assistant foremen; 21, as fire bosses; and two, as electricians.

At Windber, five were certified as first-grade foremen; 13 as second-grade foremen; seven, as first-grade assistants; 16 as second-grade assistants; five as fire bosses; and three as electricians.

» » » Attorney Matthew D. Mackie purchased for the Moffat coal mining interests of Scranton, for \$210,000, the remaining assets of the bankrupt Colonial Colliery Company of Mount Carmel, Pa. The assets were sold by John Oshinski, vice president of District No. 9, United

Mine Workers of America who acted as trustee for a Philadelphia bank, holding certain bonds in the company. For many years Colonial Colliery was the banner property of Madeira Hill and Company, Philadelphia.

Included in the sale was a modern coal cleaning plant, considerable mining machinery, and 89 dwellings located at Natalie, Pa.

» » » Production of anthracite coal from the bootleg industry declined from 3,900,000 tons in 1942 to 1,912,000 tons in 1943. During 1941 the output of bootleg coal was estimated to be around five million tons. At the present time about 2,000 men are working in coal holes, as compared with a high of 10,700 during 1941.

» » » Underground accidents in anthracite mines, on account of roof falls, have led the General Reinsurance Company to start a research program at Lehigh University, Bethlehem, Pa. The program contemplates a study of roof conditions with this object in view; to develop equipment to warn mine officials and miners of dangerous roof conditions which require attention. Dr. R. T. Gallagher, of the Department of Mining Engineering will direct the study. He will be assisted by Dr. C. G. Brennecke of the Department of Electrical Engineering.

» » » Anthracite research, directed by the United States Bureau of Mines, and authorized by Congress in 1942 has now started to function. J. W. Buch will direct an investigation of mining methods, and S. H. Ash will report on projects to prevent mine floods during periods of heavy rains.

DO YOU KNOW THIS MAN?

He may now be serving in the armed forces or otherwise employed in a selling capacity. His age is somewhere between 25 and 45 years and he is a healthy, normal person. He has built a wide and favorable acquaintance through sales contacts with top officials of large coal operating companies located in Pennsylvania, West Virginia, Virginia, Kentucky and Ohio.

He has a fair general knowledge of the coal business from pit to market and is familiar with the characteristics of various grades of explosives and their application to coal mining.

FOR SUCH A MAN THERE IS NOW AVAILABLE A DESIRABLE POSITION AS SALES MANAGER FOR A WELL ESTABLISHED MANUFACTURER SERVING THE COAL INDUSTRY.

If you know such a man you may do him a favor by calling his attention to this advertisement. If he is now serving in the armed forces, we should appreciate your writing us in his behalf. All replies should give personal history, age, family status, previous experience and employment record, present connection and indicate salary bracket. All communications will be treated in full confidence and a personal interview will be arranged if first letter indicates that qualifications warrant further consideration. Our employees know of this ad.

Communications should be addressed to

Box W, MINING CONGRESS JOURNAL

309 MUNSEY BLDG.

WASHINGTON 4, D. C.

» » » The Anthracite Committee has announced the following permanent advisory committee on standard anthracite specifications: Charles D. Rubert, Lehigh Navigation Coal Company; E. A. Reilly, Philadelphia & Reading Coal & Iron Company; C. A. Garner, Jeddo-Highland Company; James Hannigan, Glen Alden Coal Company, and H. H. Shaver, Hudson Coal Company.

» » » During June, at Hazleton, Pa., the anthracite operators and miners signed a wage agreement for a two-year period, May 1, 1943 to April 30, 1945. This came after 15 months of negotiations between both parties, and many days spent in Washington in conference with the War Labor Board, and the Office of Price Administration.

Financially the agreement provides: an increase, by application of the Little Steel formula, of 32.2 cents per day for those working on contract, or piece-work basis, and 4.6 cents per hour for those working on an hourly basis; vacation pay increased from \$20 to \$50; allowance for tools; the work day lengthened from 7 to 7½ hours, with every employee, including piece-workers, receiving 37.8 cents for the one-quarter hour; and overtime provisions liberalized. All these increases amount to approximately a dollar a day.

» » » The Saint Clair Coal Company, St. Clair, Pa., is improving its coal cleaning facilities by the installation of four new hydrotators, together with the necessary conveyor lines, pumps, and dewatering shakers. They also plan to build a new pre-cleaning plant for stripping coal, and a pocket for breaker refuse.

These improvements will not add materially to the output of the property, but they will make it possible to ship coal of a better quality.

KENTUCKY

» » » More than 500 bituminous coal miners' children from West Virginia, Pennsylvania and Kentucky already have attended Camp Thomas E. Lightfoot, summer camp operated by the Koppers Coal division of Eastern Gas and Fuel Associates for children of mine employees, and another 200 will attend before the current season ends on August 25, Thomas E. Lightfoot, director of welfare and compensation for Koppers Coal, announced recently.

Completing its fourth season, Camp Thomas E. Lightfoot occupies 75 acres of rolling countryside on the Big Bend of the Greenbrier River, 10 miles from Hinton, W. Va., and

only 50 miles from the nation's former playground at White Sulphur Springs. Here, amidst West Virginia's mountains, Koppers Coal miners' children enjoy a two-weeks' outing highlighted by supervised recreation, swimming, handicraft and folklore for only \$7 for the entire period. The program, started in 1935 when 4-H campgrounds were leased, is one phase of the company's welfare program designed to keep coal miners and their families in the best possible physical condition.

Forty miles away, on the Gauley River and three miles from Gamoca, W. Va., colored children are enjoying the same program at Camp Wyndal, opened in 1939 and headed this year by M. E. English, principal of the Morton Reaves elementary school at Beckley.

Camp Thomas E. Lightfoot's staff of 39 counselors, housekeepers and a caretaker, is headed this year by Virgil M. Beckett, Hillsboro, W. Va., graded school principal, and Miss Dorothy A. Sturdivant of the Fort Hill high school English department, Cumberland, Md.

ALABAMA

» » » The DeBardeleben Coal Corporation announces the resignation of Milton H. Fies, vice president in charge of mines. He has been associated with this company for the past 32 years, and has been active in the development and operation of their properties. He leaves them to take up specific work as a consulting engineer, and to organize a consulting engineering office, with several associates. His firm will be retained as consulting engineer for the company with which he has been associated.

Mr. Fies is a widely known industrialist and engineer, and prior to his connection with the DeBardeleben Corporation was with the Republic Steel & Iron Co., and the Birmingham Coal and Iron Co.

» » » Governor Chauncey Sparks has recently appointed Artie Hill, of Sayreton, as a member of the State Board of Mine Examiners, to succeed the late M. S. Bailey, for the term expiring in July 1945.

» » » Steel and iron mills of the Birmingham District are operating at 95 percent capacity, according to reports to the office of James A. Downey, Jr., district director of War Manpower Commission.

The leading producers of iron and steel in the state are, Tennessee Coal, Iron and RR. Co., Sloss-Sheffield Steel and Iron Co., Republic Steel Corporation and Woodward Iron Co. All operate blast furnaces.

NORTH CAROLINA

» » » N. C. State College will become headquarters for an expanded minerals program embracing the Southeast, under plans worked out by officials of the Department of Conservation and Development, the U. S. Bureau of Mines, and college officials.

Existing laboratory and machine shop facilities will be expanded, exploration of mineral deposits widened, and additional metallurgical instruction will be inaugurated. The Bureau of Mines will maintain a staff of engineers and research workers at the college. Dr. A. L. Fox, metallurgist now with the bureau's Salt Lake City, Utah, laboratories, will head the new unit here.

Dr. R. S. Dean, assistant director of the U. S. Bureau of Mines, said the laboratory here would be a part of a federal program designed to locate and utilize the nation's strategic minerals for which Congress has authorized expenditure of \$3,000,000. Dean said the plan contemplated following through to the establishment of pilot plants at scenes of deposits and actual use of such deposits.

Mineral Statistics Duplication

A PROPOSAL made early in July by the Department of Commerce to conduct a "Census of Mineral Industries" in 1946, covering 1945 domestic operations and thus duplicating work now done by the Bureau of Mines is meeting vigorous opposition from the mining industry. This plan renews a controversy that was threshed out before the House Committee on the Census in 1941 when it was clearly shown by representatives of the industry that the Bureau of Mines has been securing and compiling statistics pertaining to mining annually for many years.

As the Bureau of Mines is constantly assembling mineral raw materials statistics it quite naturally follows that any additional data considered essential to the census report can best be secured and assembled by the Bureau. Through its questionnaires, to which the mineral industry readily responds, the Bureau can make available information which will fulfill all the purposes desired by the Department of Commerce.

Local mining associations—metal, coal and non-metallic—as well as national organizations, companies and individuals are continuing to address the Honorable Jesse Jones, Secretary of Commerce, Washington, D. C., urging that a 1946 census of Domestic Mineral Industries be not undertaken but that such work be consolidated in the regular work of the United States Bureau of Mines.

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S JOURNAL



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Central



States

NORTH DAKOTA

» » » It is reported that the Truax-Traer Coal Company will open its stripping operation at Hazen, Mercer County, on October 1. Initial daily capacity will be 2,500 tons. The operation is located on a six-mile spur of the Northern Pacific Railroad.

Stripping operations will be accomplished by means of a 10-cu. yd. shovel with a 3-cu. yd. loader in the coal. A seven track tippie will make all prepared sizes employing shaker equipment for large sizes and vibrator for small. Six Euclid 20 ton semi-trailers will be used for the haul. Power for the operation will be purchased from the Dakota Public Service Company. Alfred Kelsven is superintendent of operations and H. M. Hicks is construction engineer.

» » » A large strip operation is getting under way in the vicinity of Williston, working on a 10-ft. seam of lignite on a 300 acre tract. E. F. Lovejoy, W. M. Ledahl, and L. B. Ledahl, all of Williston, are conducting the operations. A production of 60,000 tons is expected for the 1944 season.

MICHIGAN

» » » The Calument & Hecla Consolidated Copper Company is reported to be getting good results in copper production from the new Central exploratory shaft in Keweenaw County. The fissure vein is now being mined on the 300 and 350-ft. level together with a small area adjacent to the fissure. A considerable amount of mass copper is being encountered; the 1,000,000-lb. mark has already been passed.

The new shaft has for one of its principal objectives mineralization existing on the loads intersected by the fissure. So far however, none has been found. A small crew of men is working on a three-shift basis at this operation. All the copper rock produced is trucked to a loading platform at Allouez.

The diamond drilling done in the vicinity of the new Iroquois shaft of this company showed the best values to exist at depth. This is being borne out in the new shaft with showings on the 18th level proving better than in the upper ground. Exploration by drifting is being carried out on this level.

It is further reported that work is proceeding on the new No. 22 furnace at the Calument & Hecla smelter, with the foundation already poured and work on brick and steel going forward. The new furnace incorporates many new ideas in design and will be a welcome addition to company facilities.

MINNESOTA

» » » The Snowshoe Mine, operated by Rhude, Fryberger and Leach, and located on the Cuyuna Range at Riverton, Minn., has set some sort of a record this year. Stripping of this open pit iron mine was begun March 1, 1944, and the first ore was loaded July 19th; probably the best time yet for starting from the grass roots and getting a mine into production.

Three tractor scraper units of 23-yd. capacity were used for stripping this property which working two 10-hour shifts per day moved about 100,000-yds. per month. A total of 350,000-yds. of surface material was moved. Final cleanup on top of the ore was done with a 1½-yd shovel and three to four-yd. trucks. The same equipment is now being used for loading ore.

At present, the mine is loading ore on one 10-hour shift per day, with a scraper unit working on cleanup two

10-hour shifts. Average production is 2,000 tons of ore per day, loading into railroad cars over a ramp.

OHIO

» » » The Youghiogeny & Ohio Coal Company is reported to be opening a strip operation at Rayland, Jefferson County, Ohio. The initial daily capacity is expected to be 1,000 tons per day with an eventual daily goal of 1,800 tons. The number eight seam will be worked and preparation will include the usual picking tables, vibrating screens and loading booms. Frank Kain and Lewis Moscrip are in charge of the development of the new operation.

» » » It is reported that the Crescent Mining Corporation, St. Clairsville, Ohio, plans to open a stripping operation at Speidel sometime in the near future.

TRI-STATE

» » » The United Zinc Smelting Corporation is making progress in its development work on its Park-Walton lease, seven miles west of Picher, according to D. G. Harrison, of Joplin, district manager for the company.

The company has completed its No. 2, or mill, shaft to the 310-ft. level, and has connected it underground on that level with the No. 1 shaft which was sunk more than a year ago and is situated about 360-ft. to the northwest.

The company now is handling about 2,500 gallons of water from three 150-horsepower, direct-connected Pomona



35-ton capacity side-dump trailer in use in iron ore hauling operations on the Mesabi Range in Minnesota. The Walter tractor has a 300 hp. Butane using engine and can negotiate 8 to 10 percent grades at 7 to 8 miles per hour. Trailer is one-way side dump with down-folding side

pumps—each with 12-in. bowls and 9-in. discharges and installed in drill holes—to keep the water below the drift workings. Preparations are being made to install a booster pump to lower the water table for sinking the No. 2 shaft to the 350-ft. level. The No. 1 shaft already has been put down to the 352-ft. level.

A derrick and 300-ton hopper have been built over the No. 1 shaft, and similar units are under construction at the No. 2 shaft. Company plans for the construction of a mill on the site probably will be announced in the near future.

» » » Dines Mining Company is reported to have completed the moving and installation of a 400-ton hopper at its No. 3 mine on the Hartley land, a half-mile west of Baxter Springs.

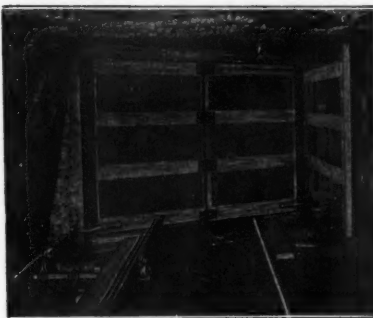
The company is conducting mine operations at about the 230-ft. level and has deepened the shaft to the sheet ground around the 260-ft. level, where operations will be extended as soon as dewatering is completed.

Ore rock from the Hartley development is being trucked to the company's Blue Mound mill north of Picher. H. G. Weidman of Baxter Springs is in charge of the operations.

» » » The Davis-Big Chief Mining Company, which recently purchased the Lucky Bill lease of the Federal Mining and Smelting Company, south of Cardin, has inaugurated expanded mine operations on the property, according to a report by Claude Jones of Picher, company manager.

The derrick and hopper has been remodeled preparatory to increasing the ore tonnage output. Mechanical loading equipment also is being in-

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stalled to build up production. A railroad spur off the N. E. O. Railroad has been built from the Eagle-Picher Hum-bah-wat-tah No. 3 shaft, a quarter-mile to the southwest, and ore rock will be hauled to the Central mill for treatment. The Lucky Bill property has been one of the many outstanding leases mined by the Federal company in the Picher field.

» » » Cameron and Henderson, Inc., is reopening the east, or No. 3, shaft on the old Admiralty lease, southeast of Cardin, according to a report by S. E. Henderson of Baxter

Springs, secretary-treasurer of the company.

A new derrick and hopper over the shaft will be used to pull dirt from three levels of the mine—90, 125 and 160-ft. Ore rock will be trucked to the company's Romo custom mill near Lincolnville.

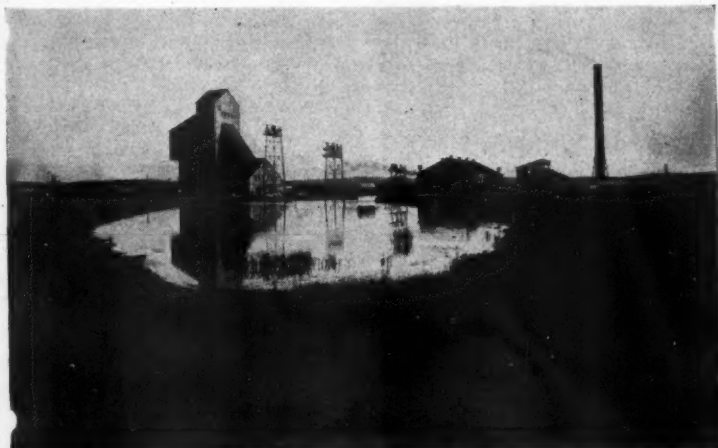
It is also reported that this company has sub-leased its Valliere mine and cut out the Nevins mine, both in the Lincolnville mining area. The Craig Mining Company continues its mine operations in the area as well as milling its ore over the Romo custom mill.

TEXAS

» » » The El Paso Chamber of Commerce, sponsor of the pageant depicting the history of the Southwest, being held in conjunction with International Mining Day on November 10 and 11, has announced a contest to find a name for the pageant, which will depict the history of the Southwest from Indian days through the present war. The mining theme will dominate, however, as the pageant is being staged as a tribute to the mining industry.

The contest is open to all. Contestants should submit their suggestions for the pageant name by October 1 to the El Paso Chamber of Commerce. One name will be selected by the Chamber's special Events Committee, and the winner will receive a \$25 War Bond as a prize.

The Chamber's Mining Committee, which is sponsoring International Min-



Ahmeek shafthouse—a prominent landmark of the Michigan copper country

ing Day, has abandoned for this year the plan to hold a central exposition as part of the event. A survey has shown that war-time conditions make it impractical for mining supply concerns to exhibit equipment this year, but many of these concerns have agreed to hold individual exhibits. Inasmuch as International Mining Day is to be an annual event in El Paso, the Mining Committee has adopted a policy to pursue its plans for a central exposition in 1945.

Invitations are going out to mining men in Arizona, Texas, New Mexico, Colorado and Mexico.

ILLINOIS

» » » The fifty-second annual meeting of the Illinois Mining Institute will be held at the Hotel Abraham Lincoln, Springfield, Ill., on Friday, October 27, 1944. Details of the program as well as announcement of the principle speaker at the evening meeting will be made in the near future, according to information received from B. E. Schonthal, secretary-treasurer.

Many of Nation's Mines Await Modernization

NINETEEN out of twenty mines in the United States can increase production and efficiency by the use of modern mechanical devices, according to W. C. Winings, head of the mechanical goods division of Goodyear Tire and Rubber Company. Indications are that a large percentage of mine owners are giving serious consideration to the extension of mechanization after the war, or sooner, if proper priorities can be secured.

"Sales of conveyor belt installations in mines have increased sharply in the past two years but this is only the beginning of the utilization of continuous methods of handling in preference to intermittently active equipment. Mine owners and miners alike have found that they can increase earnings by the use of modern equipment such as conveyor belts and motorized shuttle car trucks for underground work. Shuttle cars, in short cycles, serve to bring the coal to the belt which provides continuous efficient flow over the long haul to the tippie."

The use of conveyors is advocated as a more economical method of bringing coal and other minerals to the surface, using considerably less space for its operation, and requiring considerably less of an investment for installation. Many mines that might otherwise have been abandoned are now being profitably worked, according to Mr. Winings, the difference in cost of

operation of conveyors against older systems, being the difference between profit and loss.

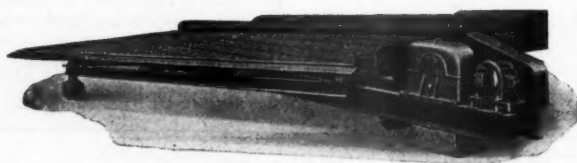
The mechanization of mines will not only provide a substantial volume of employment after the war, but each mine so modernized will furnish expanded employment on ventures that otherwise are only operated in times of highest sale prices.

Conveyor lines extending as far as six miles into the ground are now said to be in operation.

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Every pound of paper that gets back into packaging cartons and boxes will contribute to manpower saved in cutting, "toting" and shredding trees. Our mills need this material to package the fighting supplies so necessary to the big fight we're all trying so hard to win.

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SuperDuty tables operate at a very low maintenance and power consumption cost . . . users report yearly upkeep practically negligible . . . power required is less than 1½ HP under full load operation. The high quality materials and perfectly balanced construction give extra years of efficient, profitable coal washing.

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Western



States

COLORADO

» » » The Molybdenum Corporation of America recently commenced production at its Urad mine near Empire. Installations at the new mine include power line facilities, underground primary crushing plant of 50 tons an hour capacity, motor haulage through the main tunnel and an outside secondary crushing plant of 250 tons a day capacity.

All surface buildings are steam heated and heavily insulated. The plant was designed and constructed by the Southwestern Engineering Company of Los Angeles, with Whitaker and Schlereth, Denver consulting engineers controlling the entire program. W. J. Eaton is general superintendent and F. C. Blickensderfer is mill superintendent.

Operations at the old Silver Age mine in Gilson Gulch near Idaho Springs have encountered ore in the Gold Medal tunnel. Development work is reported to have indicated a steady increase in the size and value of the deposit. Preparations are already being made to mill this new ore. J. P. Ruth, Jr., of Denver, is in charge of operations.

NEW MEXICO

» » » The New Mexico Miners and Prospectors Association, Horace Moses, president, and Albert P. Mracek, secretary, is cooperating actively in plans for International Mining Day, November 10 and 11 at El Paso, Tex., sponsored by the Mining Division of the El Paso Chamber of Commerce. A pageant depicting the mining history of the Southwest will be a feature.

» » » President R. H. Reese of the New Mexico School of Mines at Socorro, has announced that the fall semester of the school will open August 28, with courses offered in civil engineering, geology, metallurgy, mining engineering and petroleum engineering. This announcement definitely sets at rest reports that the School of Mines would not operate during the coming year.

» » » Mr. C. H. MacIntosh has installed a 300-cubic-foot electrically driven air compressor on a lease of the Atwood Group, 2½ miles south of Lordsburg. The mine is producing weekly about two cars of

copper ore containing gold, silver and lead. The indications are that this mine may soon become one of Lordsburg's large producing mines.

» » » The Newalpitt Corporation has one of the largest fluorspar deposits in the state. The labor shortage has retarded development of this property for several months. A census of the milling operations discloses the fact that several metallic and non-metallic mills in this area are compelled to make unnecessary shut downs due to the fact that their mines are working shorthanded and not producing ore in quantity sufficient to make it possible to operate the mills full time.

» » » The State Bureau of Mines and Mineral Resources has just issued two new reports on the aspects of New Mexico's mineral wealth, John M. Kelly, state geologist, has announced. One bulletin is entitled, "Manganiferous Iron-Ore Deposits Near Silver City," by Lawson P. Entwistle, geologist with the American Smelting & Refining Company, and covers the Chloride Flat and Boston Hill mining districts, which since

1900 have produced 790,000 tons of manganese iron ore and 150,000 tons of silver ore. The other bulletin is entitled "Stratigraphy of the Colorado Group, Upper Cretaceous, in North New Mexico," by Charles H. Rankin, geologist for the Great Lakes Carbon Corporation.

» » » The United States Bureau of Mines, Silver City district office, in charge of C. H. Johnson, engineer, continues to carry on extensive field investigations of mining properties in New Mexico. These examinations are of great assistance to claimholders and owners of promising mineral prospects and partially developed properties, some of which have become producers to meet the demand for critical metals needed for the war. An experienced staff of mining engineers and geologists is assigned to the district office.

UTAH

» » » Development work at the American Metal Mining Company property, situated in the Big Cottonwood mining district, is progressing despite the lack of adequate manpower, according to President Charles S. Woodward.

Work is being concentrated in the Price tunnel, which is designed to crosscut several mineralized fissures at depth. The first objective is the Garfield fissure. Ore showings were developed on upper levels in the re-

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Reduction works, Phelps Dodge Corporation, Morenci, Ariz. Crushing plant in foreground with concentrator and filter plant. Shops, warehouse and change rooms in center left with bedding plant, smelter auxiliaries and smelter in near background. Power plant and tailing thickeners on the right. The plantsite residential district is in the left background

opening of the old Branborg tunnel, which was completed last year.

» » » The Bureau of Mines, after proving the presence of bismuth bearing ores in the Alta United property at Alta, has turned operations over to a private company. Considerable equipment has been installed and further testing operations are under way. Several shipments mined during the course of development have been made to Salt Lake Valley smelters.

» » » Work of reopening the old Horn Silver property, located in Beaver County, Utah, is progressing satisfactorily according to reports from the district. The King Davis shaft is being reopened and repaired to a depth of 1,000 ft. and with the completion of this work, a crosscut will be driven to the old Horn Silver ore zone. The old Horn Silver shaft from which approximately \$50,000,000 worth of ores were mined, has been abandoned for large-scale operations due to caving ground.

» » » The manpower shortage continues to plague Utah mine operators. Many mines are operating with crews approximately one-half of what is necessary for a balanced operation.

As a result production has been curtailed and little development work is being performed.

ARIZONA

» » » Arizona small mine operators believe that the federal government should freeze stockpiles of minerals and metals existing at the close of the war, and set up a program including support price purchases to keep the small operators in the business through the readjustment period, U. S. Senate subcommittee representatives were told at meetings conducted August 7 in Phoenix, August 8 in Tucson, and August 9 in Prescott.

Hearings for the subcommittee headed by Sen. James S. Scrugham (Nevada) were conducted by William C. Broadgate, assistant director of the Arizona Department of Mineral Resources, and the committee's technical consultant on mining legislation in the state.

Discussion topics in the hearings covered legislation for a postwar government stockpile of minerals and metals; postwar policies on tariffs, price stabilization and financing; and a program for setting up ore-buying stations, sampling plants, and custom mills.

Dr. Wilbur E. Nelson, deputy director, Mineral Resources Coordinating Division of the War Production Board, and Frank Kuehl, chief counsel for the Mine Loan Division of the Reconstruction Finance Corporation, attended the Arizona hearings.

» » » Arizona mining may benefit in a proposal submitted to the

U. S. Senate public lands committee that 1,500,000 acres of state land be opened to homesteading, grazing and mineral development. This land, part of the original federal grants to the old Atlantic and Pacific Railroad (now the Santa Fe) is to be returned to the government as a result of adjustments on freight tariffs.

» » » After several months idleness, the Antler copper-zinc mine, 12 miles west of Yucca in Mohave County again is in operation, all ore to be shipped to the United States Smelting, Refining and Mining Company at Midvale, Utah. The mine is now operated by the Arizona Antler Mining Company under Dr. F. F. Hintze, geologist and mining engineer. It is owned by R. B. Strassburger of New York, and M. W. Wooley of Salt Lake City.

» » » Four Arizona representatives, appointed by Gov. Sidney P. Osborn, attended a conference on postwar problems of small western mines held in San Francisco, Calif., August 10 and 11. They are: Dr. T. G. Chapman, dean of the University of Arizona College of Mines; Charles H. Dunning, director of the Arizona State Department of Mineral Resources; George A. Ballam, assistant director; and Clifford T. Carpenter, former engineer for the department.

» » » The current ore situation, high taxes, and labor difficulties has led to the closing of operations by

the Callahan Zinc-Lead Company mine at Washington Camp in Santa Cruz County. One hundred and twenty-five workers were discharged, with about 25 kept for dismantling the mill and power plant for shipment to the company's property in Nevada.

NEVADA

» » » Unable to profitably work quick-silver deposits because of unfavorable price of mercury, and confronted with an unsatisfactory tungsten situation, many Nevada operators are turning their attention to copper, lead-silver and manganese properties.

Several manganese mines in the Pumphnickel Valley region have lately been leased by strong financial interests, and reopening of a number of old copper properties in Northern Nevada is reported to be under consideration by important companies.

» » » Ott F. Heizer, for the past 20 years general manager for the Nevada-Massachusetts company, has announced his retirement from active service. He has been succeeded by Glen M. Emminger, who has been general superintendent of the company. Mr. Heizer is nationally known as an authority on tungsten, and with Charles Segerstrom and associates has operated the tungsten property near Mill City, Nev., since 1924 and organized the Nevada-Massachusetts company, which until 1942 was the largest tungsten producer in this country.

» » » Shortage of miners has compelled the International Smelting & Refining Company to curtail milling operations at its Copper Canyon mine, and the 400-ton flotation mill is now running on two shifts instead of three.

» » » Walker Mining Company, on which the International Smelting recently served notice for payment of \$513,729 in indebtedness, and the property of which is located just over the Nevada line in California, is seeking permission to reorganize, according to reports received in Reno. Walker mine was at one time one of the leading copper producers in California.

» » » Goldfield Con., is reported to be doing some drilling at the Tahoe Treasure mine above Quail Lake in Placer County, Calif. George Wingfield of Reno is president.

» » » Alex Kolchek is reported to have sold the Cash group of claims in White Pine County to a group of Elko mining men. The claims are located in the Shell Creek range, and have records of past production of gold ore running from \$32 to \$100 a ton.

» » » The St. Elmo Mining Company, with permission recently granted by the War Production Board, has resumed work on its gold property in the Gold Creek section in northern Elko County, about midway between Mountain City and Jarbidge.

» » » Fred A. Gowing, who has spent some time sampling and examining old dumps in the once famous camp of Austin, in a statement filed with the Lander County board of commissioners, indicates that the material may possibly be found suitable for effective treatment. He says however,

he finds it impossible to continue the work because of lack of gasoline. The testing thus far shows that the dumps will run about \$2 a ton and are amenable to sink-float. Most of the old Austin producers are owned by Lander County, which took them over for taxes.

OREGON

» » » It is reported that Bob King and partners have opened up a good showing of high grade chrome ore in the Murderer's Creek area in Grant County, and results of analyses

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on some samples show metallurgical grade. Shipments to the metals reserve depot at Seneca will begin soon. Hugh Campbell and partners are reported to have opened up a promising lens of high grade chrome near the King holdings, and should begin shipments to the government depot.

Ward Mallennex and Irving Hazeltine have commenced operations on the Celebration claim, and shipments will be going forward to the Seneca depot. This property has already produced about 1,000 tons of ore which averaged 38 percent Cr_2O_3 . It is also understood that the Haggard-New property which produced several hundred tons of high grade ore will be reopened, and a considerable tonnage is expected to be shipped this summer.

No gold properties are operating at the present time but considerable interest has recently been shown in possible placer operations. Bert Kumle, who was formerly with the Ferris Gold Dredging Company, and who now owns and operates a dredge in California, was in the district lately testing ground for gold values in order to plan for postwar operations.

MONTANA

» » » Dr. Frances A. Thompson has announced four new instructors at the Montana School of Mines: Dr. Stephen W. Nile, former assistant professor of physics at Reed College, Portland, Oreg., is assistant professor of physics and acting head of the department. George G. Harmon has been appointed instructor in electrical and mechanical engineering; Clarence L. Church has been appointed instructor in physics, and Cal R. Engelbart will also teach physics.

» » » It is reported that Industrial Minerals Corporation is about to commence operations at the corundum deposits about eight miles west of Gallatin Gateway. The exploration and development work which was done on these deposits during the past year by the U. S. Bureau of Mines will be extended by the new operators. It is said that this is the only corundum mine in the United States to go into production. An access road is being built by the Grazing Service and a mill will soon be under construction. A crew of

about 30 men will be employed under the direction of W. Earl Greenough, manager of operations, Gallatin Gateway.

IDAHO

» » » Bunker Hill Mining & Concentrating Company has recently made extensive machinery installations underground in preparation for sinking operations which will be continued from the present lowest level of 2,800-ft. below the Kellogg tunnel level to a new depth of 4,000-ft., or 1,600-ft. below sea level.

» » » The Mackay Exploration Mining Company at Mackay, Idaho, is now shipping crude copper ore to Salt Lake smelters from preliminary operations at the White Knob copper property. The company is making extensive preparations for mining on a larger scale by installing a milling plant, which is reported to be about ready for operation. The property has been extensively prospected by diamond drills through cooperation with the U. S. Bureau of Mines.

» » » Through diamond drill work by the U. S. Bureau of Mines, the Pearl vein at the Hope Mine at Clark's Fork has been successfully located at depth and the Hope Company has started new shaft operations to open the deposit. The overburden on the vein at the point of discovery by the drill holes is said to be 480 ft. thick. The Pearl vein has been extensively worked in the adjoining Whitedelf mine owned by Congressman Compton I. White.

» » » Clayton Silver Mines at Clayton, Idaho, in Lemhi County, is yielding an average of \$5,636.72 for carload lot shipments so far this year, according to C. A. Fay, general manager. This does not include premium payments, which would bring the average around an estimated \$6,500 a car. In spite of an acute labor shortage Clayton has been able to increase its metal production over that of last year because of richer ore values on the lower levels. The company has declared \$40,000 in dividends this year and a total of \$240,000.

» » » Bunker Hill Mining & Concentrating Company has accepted delivery of special hoisting equipment constructed at the local iron foundry plant of the Coeur d'Alene Hardware & Foundry Company in Wallace, which is part of the new equipment being installed at the Bunker Hill mine in a deeper development program.

The hoist, weighing about 20 tons, is described as a 400-h.p. electric double-drum Coeur d'Alene mine hoist. The

I-T-E and the MINING FIELD

Developments of the past ten years in mining methods have led to a very wide use of I-T-E air-immersed circuit breakers and switchgear. Consistent study of mining problems has kept I-T-E in the forefront with the result that I-T-E equipment has been a vital factor in mechanized practices.

Automatic Reclosing Circuit Breakers

I-T-E automatic reclosing circuit breakers with load measuring characteristics are widely used in mines where d-c trolley and feeder systems are employed and where overload peaks and faults arise frequently. Type KSA is for substation use in protecting and controlling semi-automatic or full automatic M-G sets, rotary converters and mercury arc rectifiers. Type KSC is used in sectionalizing service to localize faults. Sectionalizing provides for maximum production at reduced cost for power, for electrical maintenance and machine repairs.

Load Distributors

I-T-E Type LDR Load Distributor improves service from two or more M-G sets or rotary converters in parallel on same system but widely separated. Generator loads are balanced to prevent over-heating, outages are reduced, peaks are limited and life of system and connected equipment prolonged.

Automatic Switchboards For Mines

I-T-E has designed and built many switchboards in recent years for semi-automatic or full-automatic protection and control in connection with local generating systems or purchased energy. The switchboards are for service with M-G sets, rotary converters and mercury arc rectifiers. Much of the equipment, including circuit breakers and protective relays, has been designed specifically for mining service. Mounting is simplified and there is much flexibility in space arrangements. A typical installation is at right. (Fig. 4.)

Representatives in Principal Mining Areas

I-T-E

CIRCUIT BREAKER CO.

PHILADELPHIA 30, PA.

Fig. 1

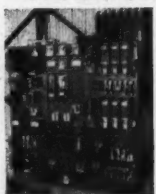


Fig. 1 is a Type KSC automatic reclosing circuit breaker for sectionalizing service. Steel enclosure is open. Fig. 2 shows a Type KSA automatic reclosing circuit breaker for substation service.

Fig. 2



Fig. 3 Type LDR Load Distributor, panel mounted, in glass front, dust-proof cover.



rope pull is 17,000 pounds at 800 feet per minute to a depth of 2,000 feet with a four-ton load. The two steel drums are 4.0 feet each in diameter by 4.6 feet drum face and each drum is equipped with 2,100 feet of 1½-inch steel cable. The machine is equipped with SKF spherical roller bearings and with Lilly Model "C" safety controllers, which will prevent overspeed, overwinding and underwinding and stops the hoist in case of power failure. It has dynamic breaking on the power end and is powered by General Electric motors.

CALIFORNIA

» » » The historic Newton mine, an important copper producer in the Ione region, is now controlled by Bradley Mining Co. Several carloads of profitable ore have been shipped weekly from the Newton to custom smelter since last September.

Sinking of the main shaft to further depth and development of ore bodies disclosed by core drilling is reported to be planned by the new management. The Newton was reopened in 1942 by J. H. Lester of Jackson after it had been idle 40 years, and was later acquired by Winston Copper Co. of Los Angeles. Large reserves of commercial ore are said to be exposed. The drilling program conducted two years ago by U. S. Bureau of Mines located important deposits at an approximate depth of 1,000 ft.

Discovered 80 years ago, the Newton was first worked in 1866 by C. T. Meader & Co. Ore mined at that time from shallow workings is said to have ranged from 12 to 34 percent copper. In 1886 the property was reconditioned by Howard D. Ranlett, equipped with a smelter treating 90 tons of ore daily and mining conducted to a depth approximating 400 ft.

» » » About 120 tons of ore per week are being produced at the Quail Hill mine near Copperopolis, Calaveras County. Principal values are copper and zinc with some gold and silver. A force of ten men is employed. The ore is taken a distance of 35 miles to Farmington and then shipped to Salt Lake City to International Smelting and Refining Company. A considerable amount of exploration work has already been done and an access road from Stockton Highway is under construction. G. Ivan Smith of Bell, Calif., is operator and Roy L. Kirk, Copperopolis is superintendent of operations.

One Hundred Years



ROBERT HALOWELL RICHARDS, professor emeritus of mining engineering at Massachusetts Institute of Technology, celebrated his one-hundredth birthday, August 26. He is the Institute's oldest living graduate, being one of the first to receive the B. S. degree in 1868.

After graduation he became a member of the faculty and in 1873 was made professor of mining engineering, retiring as professor emeritus in 1914, after teaching for

46 years. He became internationally famous for his writings, on numerous mining subjects. His text books on ore dressing were the first in our language and have been most widely employed by both students and engineers.

He has accomplished much in the fields of invention and education where he has been a true leader. His keen powers of observation, inquiring mind and creative genius have been inspiring to many. Among the numerous honors that have come to Professor Richards are: the degree of LL. D., University of Missouri, in 1908, past president and honorary member, American Institute of Mining and Metallurgical Engineers, honorary life member of the Canadian Institute of Mining and Metallurgy, honorary member of the Mining and Metallurgical Society of America which awarded him the gold medal in 1925.

He still lives in the home to which he and Mrs. Richards moved 70 years ago in Jamaica Plain, Mass.

» » » The Tuolumne Gold Dredging Company, operating at La Grange, is said to be continuing profitable placer mining operations on a limited scale through special permission of the War Production Board. Work was closed in October, 1942, in compliance with the WPB gold mining order. John A. McDonald is president and Estey Julian is general manager of Tuolumne Gold Dredging. Both men live in San Francisco.

» » » The old Cerro Gordo mine, near Keeler in southern Inyo County, after a period of several years of scattered operations, has now been brought into steady production. Shipments of silver-lead ore are being made regularly. The Golden Queen Mining Company, under the management of William C. Browning of Los Angeles, has done extensive development work at the mine since commencement of operations last year. Results of this work point to a satisfactory continuation of ore production. Most of the new work has centered at the main Cerro Gordo shaft.

» » » The Butte Lode Mining Company has re-commenced active milling operations, following suspension since November, 1942. Under a new arrangement with the War Production Board the company will be permitted to accept up to 100 tons of

custom gold ore from each operator and the mill must take ore only from mines which were operating before issue of the gold closing order. E. L. Wegmann, of Randsburg, is general manager and Jack Kreta, also of Randsburg, is mill superintendent.

BOOK REVIEW

MANGANESE IN CALIFORNIA:

Bulletin Number 125 by the State Division of Mines presents a complete and up-to-date survey of manganese production in California. A history of the industry is presented. The occurrence and minerals of manganese are discussed at considerable length and the utilization of California manganese ores is discussed in such a way as to give the reader a pretty good idea of the way in which this problem is handled.

There is a summary report with tabulated data on the various manganese properties of the state, with information on pertinent production figures. There are also two papers on the genesis of the manganese deposits on the Coast Range and of the Sierra-Nevada. A large outline map accompanies the bulletin.

Manufacturers Forum

New Amsco-Nagle Centrifugal Pump Mountings

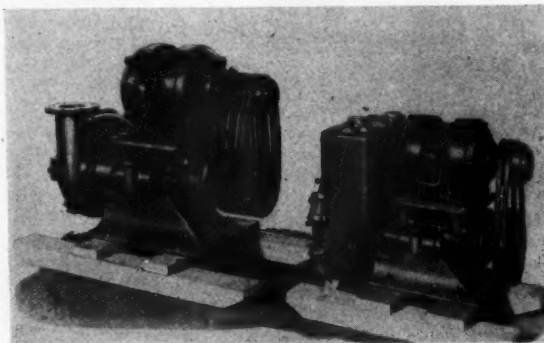
Previously available with motor directly coupled to the impeller shaft or with "V" belt pulley, flat pulley or sprocket on the shaft, Amsco-Nagle Centrifugal Pumps of the horizontal type are now available with the motor mounted overhead as shown.

This new arrangement offers the following advantages, according to the engineers responsible for its design: Pump can be operated at more accurate speeds; speed changes can be provided where the duty calls for such changes; motor is stationed at a more accessible point and is at the same time protected against flooding; the arrangement re-

quires less floor space for installation.

The manufacturer's Type "A" and Type "T" pumps, both horizontal, are available with this motor mounting. A 5-in. Type "T" pump and a 2-in. Type "A" (at right) are shown.

Amsco-Nagle pumps are made by



the American Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Ill.

Nubun—A New Insulation

Nubun, a new synthetic rubber latex insulation for power, lighting and communication cable has been developed by United States Rubber Company. The new insulation is a result of war time developments in rubber technology and will permit the design of new types of wire and cable with improved electrical and physical characteristics.

Made by the now famous latex continuous dip method, Nubun will have great advantages over ordinary wire where replacement and space are important factors. Fire alarm, wire and cable police communication systems as well as other highly essential telephonic systems will be more easily replaced and serviced and will have greater resistance to destructive forces which cause circuit troubles with the use of this type of wire, it was stated.

Qualities of Nubun insulation cited by Mr. Higbee, manager of the wire and cable department, include flexibility, impermeability to water, laminated construction, and perfect centering of the conductor to produce an insulated wire of maximum conductivity and minimum diameter.

The synthetic insulation is said to be exceptionally homogeneous following vulcanization and has high electrical characteristics such as dielectric strength and insulation resistance. The special synthetic rubber compound is low in specific conductive capacity, has good aging qualities because of the presence of special anti-oxidants, and will resist severe wear because of the nature of the latex process, the rubber particles are not distorted or broken down by milling.

Nubun insulation is made from a special modification of buna S synthetic rubber.

Announcements

The name of the American-Terry Derrick Co., South Kearny, N. J., has been changed to American Hoist & Derrick Co., Plant No. 2, South Kearny, N. J.

* * *

The office and laboratories of Sam Tour & Co., Inc., engineers, metallurgists, consultants, are now located in their building at 44 Trinity Place, New York 6, N. Y.

New Storage Battery

A new industrial truck storage battery with 30 percent longer life has just been announced by M. W. Heinrich, vice president in charge of the Storage Battery Division of Philco Corporation. Named the "Philco Thirty," this battery incorporates a new principle of fabricated glass tape insulation which is said to greatly lengthen the efficient service life of the battery's power-producing positive plates.

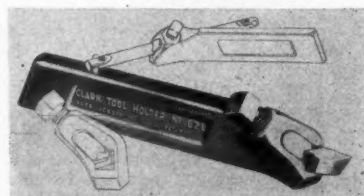
In the new "Philco Thirty," glass mats are replaced by a jacket of glass tape insulation which completely encases the positive plates. The tape is wrapped around the plates in a double layer, one horizontal and the other vertical, both with ample overlap to assure a homogeneous film.

A single layer of this glass tape has been found to have better retentive power in holding the active material in the plate, than the standard glass mat. Moreover, by completely encasing the grid frames, the rate of peroxidation of these grids is materially decreased. In both respects, battery life is lengthened.

At present, the new battery is available in certain sizes and limited quantities. But with the easing of wartime restrictions the line will include types and sizes for all battery powered industrial truck equipment.

New Tool Holder

A new adjustable tool holder with a vise grip for use in lathes, shapers, and planers is announced by the Robert H. Clark Company of 9330 Santa Monica Blvd., Beverly Hills, Calif. The exclusive Clark principle



of adjustability makes possible the use of any of four or more sizes of tool bits in the same holder instead of requiring a separate holder for each size, thus saving the mechanic's time by enabling him to change bit sizes without changing holders. Models available are the 15° sloping cutter channel type and the horizontal or parallel channel type in both right

and left hand offset. Each type is available in several shank sizes.

The Clark tool holder has a special vise grip jaw for holding the bit vertically and horizontally with pressure evenly distributed over the entire holder channel, thus preventing tool bit breakage especially of the more brittle expensive alloy bits.

This "vise grip" rigidly and firmly holds very short tool bits, effecting economies by using up short bits which would otherwise be scrapped. Square, round, out-of-round, under-size or dual narrow bits for cutting-off or forming operations, are all held equally rigid.

New Cleaning Plant Construction

The following announcement of new plants has just been received from Roberts and Schaefer Co., Chicago, Ill.

Red Lands Coal Company, Red Lands, Pa.—Stump air-flow coal cleaning plant to clean ¼-in. x 0 slack, capacity 70 tons per hour; plant to be in operation September 1.

Morris Run Coal Mining Company, Morris Run, Pa.—Stump air-flow coal cleaning plant to clean 50 tons per hour of ¾-in. x 0 coal; plant to be completed December 1.

Island Creek Coal Company, Mine No. 15, Verdunville, W. Va.—combination wet and dry coal cleaning plant embodying R&S hydro-separators, 150 tons per hour, cleaning 5-in. x ¼-in. coal, and Stump air-flow coal cleaning unit cleaning 35 tons per hour of ¼-in. x 0 coal.

Island Creek Coal Company, Mine No. 16 Verdunville, W. Va.—combination wet and dry coal cleaning plant embodying R&S hydro-separators, 150 tons per hour, cleaning 5-in. x ¼-in. coal, and Stump air-flow coal cleaning unit cleaning 35 tons per hour of ¼-in. x 0 coal.

West Kentucky Coal Company, Earlington, Ky.—coal washing plant embodying R&S Tandem hydro-separator, capacity 170 tons per hour, washing 1½-in. x ¼-in. coal; to be completed December 15.

New Research Director

Appointment of Dr. Walter M. Mitchell, as director of research for Mack has been announced by L. C. Josephs, engineering vice president of Mack Trucks, Inc. Dr. Mitchell will direct chemical, metallurgical, electrical, mechanical, Diesel, fuels, lubricants and other research activities allied to the truck firm's products.

Before joining the Mack organization, he was chief metallurgist for the York Safe and Lock Company's special ordnance plant producing Bofors anti-aircraft guns for the U.



In this new aluminum reduction plant, a battery of 24 twelve-tank Allis-Chalmers Exatron mercury-arc rectifiers furnish direct current to two potlines in which aluminum oxide is reduced. Left: High speed anode circuit breakers. Right: Cathode circuit breakers

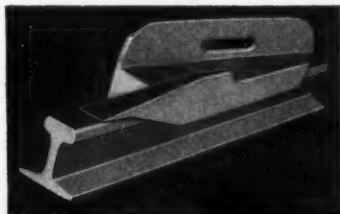
S. Navy. He was metallurgical engineer with Carnegie Illinois and other U. S. Steel subsidiaries and held a similar post with Republic Steel Corp., and its predecessor companies.

While with E. I. duPont de Nemours & Co., he introduced the use of stainless steel in the construction of plants used for the production of nitric acid, which revolutionized the manufacture of that chemical.

New Car Deraill

The Portable Lamp & Equipment Co., 420 Blvd. of the Allies, Pittsburgh, 19, Pa., has recently developed a new type mine car derail in an effort to reduce haulage accidents.

This derail is designed so that it



operates like a switch and eliminates the danger of the car wheels jumping over the device. No tools are necessary to install the device. Simply place the derail on the rail and tighten by means of a roller binding on the rail head. It is quickly and easily released by kicking in the opposite direction.

No. T-3-25 takes care of 25-40 lb. rails and T-3-45 is for 45-60 lb. rails.

CATALOGS AND BULLETINS

ANTI-RUST. *M. B. Price Associates, Empire State Building, New York City,* offers a small folder setting forth the advantages of Rozene which is described as a safe, fast, and economical oxide solvent.

COAL CRUSHER. *Jeffrey Manufacturing Company, Columbus 16, Ohio.* Bulletin No. 777 describes the Flexroll coal crusher, a small capacity machine for coal mines and coal yards. Dimensions and capacities and illustrations of application are included.

DUMP CARS. *Pressed Steel Car Co., Inc., Industrial Division, Pittsburgh, Pa.* The Pressed Steel Car line of Rolling Trunnion Automatic Air Dump cars featuring easy, positive, fast dumping action under all conditions, is completely described in a new Catalog No. 72-C, according to the manufacturer.

ELECTRONIC RELAY. *The General Electric Company, Schenectady, N. Y.* The bulletin, CR 7511-A describes a new electronic relay designed to fill many needs such as liquid level control, detection of water in gasoline tanks, sorting small parts, maintaining constant temperature baths, etc.

FIRE-PROOF CLOTHING. *The B. F. Goodrich Co., Akron, Ohio.* A catalog section on this company's recently introduced line of industrial clothing coated with rubber or rubber-like materials has just been published and is now available upon request.

MOLYBDENUM IN STEEL. *Chloras Molybdenum Co., 500 Fifth Avenue, New York City.* Section II Chromium-Molybdenum Steels in a revised version contains much new data. General characteristics, production and heat treatment, alloying elements, carburizing, etc., are brought up to date. Numerous details and diagrams are included which should be helpful to those who have use for these materials.



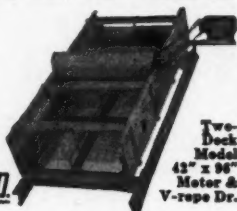
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